

Williams Ohio Valley Midstream LLC
100 Teletech Drive, Suite 2
Moundsville, WV 26041
(304) 843-3125
(304) 843-3131 fax

Keatley
13-3109TB
051-00156

February 18, 2015
(Via Federal Express)

Bev McKeone
New Source Review Program Manager
Division of Air Quality
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304-2345

Subject: Application for 45CSR13 NSR Modification Permit
Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
Marshall County, West Virginia

Dear Ms. McKeone,

Williams Ohio Valley Midstream LLC (OVM) is submitting an Application for 45CSR13 New Source Review (NSR) Modification Permit for the existing Taylor Compressor Station, located approximately 1.0 Miles South of Fork Ridge Rd, approximately 5.0 Miles Southeast of Moundsville, Marshall County, West Virginia.

This application for 45CSR13 NSR Modification Permit has been prepared and submitted to update the existing permit to reflect actual construction and operations, as follows:

- Increased the Dehydration Unit throughput capacity;
- Corrected calculations to show no Still Vent Condenser on the Dehydration Unit;
- Used more conservative Dehydrator Operation parameters (temp and pressure);
- Included Rod Packing and Crankcase Emissions;
- Included Water/Oil Fugitive Emissions;
- Updated Extended Gas Analysis; and
- Updated emission factors and other emission estimating protocols.

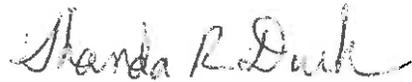
Proposed edits to the current permit are provided in Attachment T – Current Permit.

The facility continues to qualify as a Minor Source under Non-Attainment New Source Review (NNSR), Prevention of Significant Deterioration (PSD), and Title V Operating Permits. The facility is also an Area Source for Hazardous Air Pollutants (HAP) under the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations.

Bev McKeone
WVDEP – Division of Air Quality
February 18, 2015
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If you have any questions concerning this submittal or need additional information, please contact me at (304) 843-3125 or Shanda.Durham@Williams.com.

Sincerely,

A handwritten signature in cursive script that reads "Shanda R. Durham".

Shanda R. Durham
Environmental Specialist

Enclosures:

Application for NSR Construction Permit w/ Attachments A through T
Check for Application Fee

**APPLICATION FOR
45CSR13 NEW SOURCE REVIEW
MODIFICATION PERMIT**



For the:
**Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
Marshall County, West Virginia**

Submitted to:



**WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY**

Submitted by:



**Williams Ohio Valley Midstream LLC
100 Teletech Drive, Suite 2
Moundsville, WV 26041**

Prepared by:



**EcoLogic Environmental Consultants, LLC
864 Windsor Court
Santa Barbara, CA 93111**

February 2015

APPLICATION FOR 45CSR13 NSR MODIFICATION PERMIT

Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
Marshall County, West Virginia

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APPLICATION FEE

**APPLICATION FOR
45CSR13 NSR
MODIFICATION PERMIT**

-
- **SECTION I. General**
 - **SECTION II. Additional Attachments and Supporting Documents**
 - **SECTION III. Certification of Information**
-



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
 601 57th Street, SE
 Charleston, WV 25304
 (304) 926-0475
www.dep.wv.gov/daq

**APPLICATION FOR NSR PERMIT
 AND
 TITLE V PERMIT REVISION
 (OPTIONAL)**

PLEASE CHECK ALL THAT APPLY TO NSR (45CSR13) (IF KNOWN):
 CONSTRUCTION MODIFICATION RELOCATION
 CLASS I ADMINISTRATIVE UPDATE TEMPORARY
 CLASS II ADMINISTRATIVE UPDATE AFTER-THE-FACT

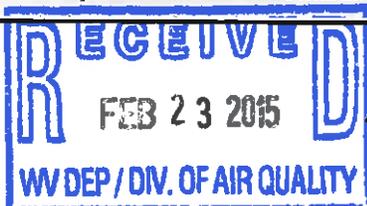
PLEASE CHECK TYPE OF 45CSR30 (TITLE V) REVISION (IF ANY):
 ADMINISTRATIVE AMENDMENT MINOR MODIFICATION
 SIGNIFICANT MODIFICATION NOT APPLICABLE
 IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS ATTACHMENT S TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant (as registered with the WV Secretary of State's Office): WILLIAMS OHIO VALLEY MIDSTREAM LLC (OVM)		2. Federal Employer ID No. (FEIN): 27-0856707	
3. Name of facility (if different from above): TAYLOR COMPRESSOR STATION		4. The applicant is the: <input type="checkbox"/> OWNER <input type="checkbox"/> OPERATOR <input checked="" type="checkbox"/> BOTH	
5A. Applicant's mailing address: 100 TELETECH DRIVE, SUITE 2 MOUNDSVILLE, WV 26041		5B. Facility's present physical address: ~1.0 MILES SOUTH OF FORK RIDGE RD ~5.0 MILES SOUTHEAST OF MOUNDSVILLE	
6. West Virginia Business Registration. Is the applicant a resident of the State of West Virginia? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO - If YES, provide a copy of the Certificate of Incorporation/Organization/Limited Partnership (one page) including any name change amendments or other Business Registration Certificate as Attachment A . - If NO, provide a copy of the Certificate of Authority/Authority of L.L.C./Registration (one page) including any name change amendments or other Business Certificate as Attachment A .			
7. If applicant is a subsidiary corporation, please provide the name of parent corporation: THE WILLIAMS COMPANIES, INC.			
8. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO - If YES, please explain: APPLICANT OWNS THE PROPERTY - If NO, you are not eligible for a permit for this source.			
9. Type of plant or facility (stationary source) to be constructed, modified, relocated, administratively updated or temporarily permitted (e.g., coal preparation plant, primary crusher, etc.): 1389 - OIL AND GAS FIELD SERVICES, N.E.C.		10. North American Industry Classification System (NAICS) code for the facility: 213112 - SUPPORT ACTIVITIES FOR OIL AND GAS OPERATIONS	
11A. DAQ Plant ID No. (existing facilities): 051-00156		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (existing facilities): R13-3109A - ISSUED 03/10/14	
12A. Directions to the facility: - For Modifications, Administrative Updates or Temporary permits at an existing facility, please provide directions to the <i>present location</i> of the facility from the nearest state road; - For Construction or Relocation permits , please provide directions to the <i>proposed new site location</i> from the nearest state road. Include a MAP as Attachment B . FROM LAFAYETTE AVE/WV-2 IN MOUNDSVILLE: HEAD EAST ONTO 7TH ST (250/88) FOR ~0.2 MI; TURN LEFT ONTO JEFFERSON AVE IN ~0.4 MI; TURN LEFT ONTO 12TH ST IN ~0.8 MI (12TH ST BECOMES FORK RIDGE RD.); CONTINUE ON FORK RIDGE RD FOR ~5.6 MI.; TURN RIGHT ONTO GRAVEL ROAD AND TRAVEL ~1.0 MI UNTIL YOU COME TO SITE.			

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.



Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
 Page 01 of 04

12.B. New site address (if applicable): NA	12C. Nearest city or town: MOUNDSVILLE	12D. County: MARSHALL
12.E. UTM Northing (KM): 4,412.077 km Northing	12F. UTM Easting (KM): 526.594 km Easting	12G. UTM Zone: 17S
13. Briefly describe the proposed change(s) at the facility: THIS APPLICATION IS PREPARED AND SUBMITTED TO: <ul style="list-style-type: none"> • INCREASE THE DEHYDRATION UNIT THROUGHPUT CAPACITY • CORRECT CALCULATIONS TO SHOW NO STILL VENT CONDENSER ON THE DEHYDRATION UNIT; • USE MORE CONSERVATIVE DEHYDRATOR OPERATION PARAMETERS (TEMP AND PRESSURE); • INCLUDE ROD PACKING AND CRANKCASE EMISSIONS; • INCLUDE WATER/OIL FUGITIVE EMISSIONS; • UPDATE EXTENDED GAS ANALYSIS; AND • UPDATE EMISSION FACTORS AND OTHER EMISSION ESTIMATING PROTOCOLS 		
14A. Provide the date of anticipated installation or change: – If this is an After-The-Fact permit application, provide the date upon which the proposed change did happen: NA		14B. Date of anticipated Start-Up if a permit is granted: UPON PERMIT ISSUANCE
14C. Provide a Schedule of the planned Installation of/Change to and Start-Up of each of the units proposed in this permit application as Attachment C (if more than one unit is involved).		
15. Provide maximum projected Operating Schedule of activity/activities outlined in this application: Hours Per Day: 24 Days Per Week: 7 Weeks Per Year: 52		
16. Is demolition or physical renovation at an existing facility involved? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
17. Risk Management Plans. If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your Risk Management Plan (RMP) to U.S. EPA Region III.		
18. Regulatory Discussion. List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (<i>if known</i>). A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance (<i>if known</i>). Provide this information as Attachment D .		

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR22 and 45CSR13).
20. Include a Table of Contents as the first page of your application package.
21. Provide a Plot Plan , e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as Attachment E (Refer to Plot Plan Guidance). – Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).
22. Provide a Detailed Process Flow Diagram(s) showing each proposed or modified emissions unit, emission point and control device as Attachment F .
23. Provide a Process Description as Attachment G . – Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).
24. Provide Material Safety Data Sheets (MSDS) for all materials processed, used or produced as Attachment H . – For chemical processes, provide a MSDS for each compound emitted to the air.
25. Fill out the Emission Units Table and provide it as Attachment I .
26. Fill out the Emission Points Data Summary Sheet (Table 1 and Table 2) and provide it as Attachment J .
27. Fill out the Fugitive Emissions Data Summary Sheet and provide it as Attachment K .
<i>All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.</i>

28. Check all applicable **Emissions Unit Data Sheets** listed below:
- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> Bulk Liquid Transfer Operations (TLO) | <input type="checkbox"/> Haul Road Emissions | <input type="checkbox"/> Quarry |
| <input type="checkbox"/> Chemical Processes | <input type="checkbox"/> Hot Mix Asphalt Plant | <input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities |
| <input type="checkbox"/> Concrete Batch Plant | <input type="checkbox"/> Incinerator | <input checked="" type="checkbox"/> Storage Tanks (T01 and T02) |
| <input type="checkbox"/> Grey Iron and Steel Foundry | <input type="checkbox"/> Indirect Heat Exchanger | |
- General Emission Unit, specify:**
- **NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET (CE-1)**
 - **NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET (RSV-1, RBV-1)**
 - **FUGITIVE LEAK SOURCES (FUG-G AND FUG-W)**

Fill out and provide the Emissions Unit Data Sheet(s) as Attachment L.

29. Check all applicable **Air Pollution Control Device Sheets** listed below:
- | | | |
|---|---|--|
| <input type="checkbox"/> Absorption Systems | <input type="checkbox"/> Baghouse | <input type="checkbox"/> Flare |
| <input type="checkbox"/> Adsorption Systems | <input type="checkbox"/> Condenser | <input type="checkbox"/> Mechanical Collector |
| <input type="checkbox"/> Afterburner | <input type="checkbox"/> Electrostatic Precipitator | <input type="checkbox"/> Wet Collecting System |
- Other Collectors, specify: **NON-SELECTIVE CATALYTIC REDUCTION**

Fill out and provide the Air Pollution Control Device Sheet(s) as Attachment M.

30. **Provide all Supporting Emissions Calculations** as Attachment N, or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as Attachment O.

- Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a Class I Legal Advertisement in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and *Example Legal Advertisement* for details). Please submit the Affidavit of Publication as Attachment P immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

YES NO

- If YES, identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's "Precautionary Notice – Claims of Confidentiality" guidance found in the *General Instructions* as Attachment Q.

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable Authority Form below: **NA**

- | | |
|--|---|
| <input type="checkbox"/> Authority of Corporation or Other Business Entity | <input type="checkbox"/> Authority of Partnership |
| <input type="checkbox"/> Authority of Governmental Agency | <input type="checkbox"/> Authority of Limited Partnership |

Submit completed and signed Authority Form as Attachment R.

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. Certification of Information. To certify this permit application, a Responsible Official (45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

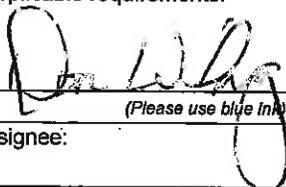
Certification of Truth, Accuracy, and Completeness

I, the undersigned **Responsible Official** / **Authorized Representative**, hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE: _____

(Please use blue ink)


DATE: _____

(Please use blue ink)
 2/19/2015

35B. Printed name of signee: DON WICBURG	35C. Title: VICE PRESIDENT AND GENERAL MANAGER	
35D. E-mail: DON.WICBURG@WILLIAMS.COM	36E. Phone: (304) 843-3158	36F. FAX: (304) 843-3131
36A. Printed name of contact person: SHANDA R. DURHAM	36B. Title: ENVIRONMENTAL SPECIALIST	
36C. E-mail: SHANDA.DURHAM @WILLIAMS.COM	36D. Phone: (304) 843-3125	36E. FAX: (304) 843-3131

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Attachment A: Business Certificate | <input checked="" type="checkbox"/> Attachment K: Fugitive Emissions Data Summary Sheet |
| <input checked="" type="checkbox"/> Attachment B: Map(s) | <input checked="" type="checkbox"/> Attachment L: Emissions Unit Data Sheet(s) |
| <input checked="" type="checkbox"/> Attachment C: Installation and Start Up Schedule | <input checked="" type="checkbox"/> Attachment M: Air Pollution Control Device Sheet(s) |
| <input checked="" type="checkbox"/> Attachment D: Regulatory Discussion | <input checked="" type="checkbox"/> Attachment N: Supporting Emissions Calculations |
| <input checked="" type="checkbox"/> Attachment E: Plot Plan | <input checked="" type="checkbox"/> Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans |
| <input checked="" type="checkbox"/> Attachment F: Detailed Process Flow Diagram(s) | <input checked="" type="checkbox"/> Attachment P: Public Notice |
| <input checked="" type="checkbox"/> Attachment G: Process Description | <input type="checkbox"/> Attachment Q: Business Confidential Claims) (NA) |
| <input checked="" type="checkbox"/> Attachment H: Material Safety Data Sheets (MSDS) | <input type="checkbox"/> Attachment R: Authority Forms) (NA) |
| <input checked="" type="checkbox"/> Attachment I: Emission Units Table | <input type="checkbox"/> Attachment S: Title V Permit Revision Information) (NA) |
| <input checked="" type="checkbox"/> Attachment J: Emission Points Data Summary Sheet | <input checked="" type="checkbox"/> Application Fee |

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

- Forward 1 copy of the application to the Title V Permitting Group and
- For Title V Administrative Amendments:
 - NSR permit writer should notify Title V permit writer of draft permit
- For Title V Minor Modifications:
 - Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,
 - NSR permit writer should notify Title V permit writer of draft permit.
- For Title V Significant Modifications processed in parallel with NSR Permit revision:
 - NSR permit writer should notify a Title V permit writer of draft permit,
 - Public notice should reference both 45CSR13 and Title V permits,
 - EPA has 45 day review period of a draft permit.

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.



Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
 Page 04 of 04

ATTACHMENT A
Business Certificate

"6. **West Virginia Business Registration.** Provide a copy of the Certificate of Authority/Authority of L.L.C./Registration (one page) including any name change amendments or other Business Certificate as Attachment A."

- **Certificate of Amendment to the Certificate of Authority**
From: CAIMAN EASTERN MIDSTREAM, LLC
To: WILLIAMS OHIO VALLEY MIDSTREAM LLC
Date: May 15, 2012

 - **Certificate of Authority of a Foreign Limited Liability Company**
To: CAIMAN EASTERN MIDSTREAM, LLC
Date: September 11, 2009
-

State of West Virginia



Certificate

*I, Natalie E. Tennant, Secretary of State of the
State of West Virginia, hereby certify that*

the attached true and exact copy of the Articles of Amendment to the Articles of Organization of
CAIMAN EASTERN MIDSTREAM, LLC

are filed in my office, signed and verified, as required by the provisions of West Virginia Code
§31B-2-204 and conform to law. Therefore, I issue this

CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the limited liability company to

WILLIAMS OHIO VALLEY MIDSTREAM LLC

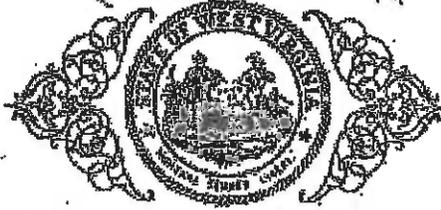


*Given under my hand and the
Great Seal of the State of
West Virginia on this day of
May 15, 2012*

Natalie E. Tennant

Secretary of State

State of West Virginia



Certificate

*I, Natalie E. Tennant, Secretary of State of the
State of West Virginia, hereby certify that*

CAIMAN EASTERN MIDSTREAM, LLC

Control Number: 99GIS

a limited liability company, organized under the laws of the State of Texas
has filed its "Application for Certificate of Authority" in my office according to the provisions
of West Virginia Code §31B-10-1002. I hereby declare the organization to be registered as a
foreign limited liability company from its effective date of September 11, 2009, until a
certificate of cancellation is filed with our office.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY

to the limited liability company authorizing it to transact business in West Virginia



*Given under my hand and the
Great Seal of the State of
West Virginia on this day of
September 11, 2009*

Natalie E. Tennant

Secretary of State

ATTACHMENT B
Location/Topographic Map

"12A. For **Modifications, Administrative Updates** or **Temporary** permits at an existing facility, please provide directions to the present location of the facility from the nearest state road. Include a MAP as Attachment B."

- **Address:**
 - ~1.0 Miles South of Fork Ridge Rd
 - ~5.0 Miles Southeast of Moundsville
 - Moundsville, Marshall County, WV 26041

 - **Latitude and Longitude:**
 - 39°51'29.9" North x -80°41'20.8" West
 - (39.8583° North x -80.6891° West)

 - **UTM:**
 - 526.594 km Easting x 4,412.077 km Northing x Zone 17

 - **Elevation:**
 - ~1,200'

 - **Directions:**
 - From Lafayette Ave/WV-2 in **Moundsville:**
 - a. Head east onto 7th St (250/88) ~0.2 Mi;
 - b. Turn left onto Jefferson Ave ~0.4 Mi;
 - c. Turn left onto 12th St ~0.8 Mi;
 - d. 12th St becomes Fork Ridge Rd.
 - e. Continue on Fork Ridge Rd. ~5.6 Mi.
 - e. Turn right onto gravel road ~1.0 Mi.

 - **USGS:**
 - 7.5" Topographic – Majorsville and Glen Easton WV – 1960
-

EXTERRAN

Williams

DPM with NAD83 datum, Zone 17
US Foot, Central Meridian 81d W
1447288 9804 E - 1276670913

CAD FILE: R:\0321-2172_Burch_Edge_Compressor_P-1\0321-2172\0321-2172.dwg
PLOT DATE/TIME: 10/21/2012 3:24 PM
LAYOUT: Ugnb_TAYLOR
USER: hnd r. mester

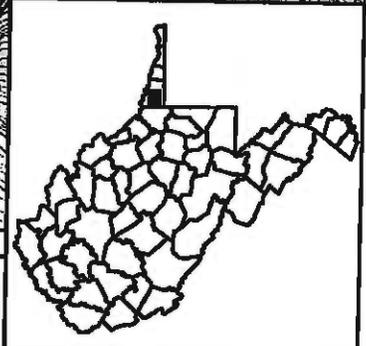
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REFERENCE: USGS 7.5' QUADRANGLE MAPS OF: MAJORSVILLE AND GLEN EASTON, WV; DATED 1960 - SCALE: 1"=2000'

PHONE (304) 624-4108
THRASHER ENGINEERING
CIVIL, ENVIRONMENTAL, AND CONSULTING
30 COLUMBIA BOULEVARD - CLARKSBURG, WV 26301
(FAX) (304) 624-7831

OHIO VALLEY MIDSTREAM LLC
TAYLOR COMPRESSOR STATION
MARSHALL COUNTY, WEST VIRGINIA
SITE LOCATION MAP



ATTACHMENT C

Installation and Start-Up Schedule

"14C. Provide a **Schedule** of the planned **Installation of/Change** to and **Start-Up** of each of the units proposed in this permit application as Attachment C."

The OVM Taylor Compressor Station is an existing operation. This application is prepared and submitted to update the existing permit to reflect actual construction and operations, as follows:

- Increased Dehydration Unit throughput capacity;
 - Corrected calculations to show no Still Vent Condenser on the Dehydration Unit;
 - Used more conservative Dehydrator Operation parameters (temp and pressure);
 - Included Rod Packing and Crankcase Emissions;
 - Included Water/Oil Fugitive Emissions;
 - Updated Extended Gas Analysis; and
 - Updated emission factors and other emission estimating protocols
-

ATTACHMENT D
Regulatory Discussion

"18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (if known). Discuss applicability and proposed demonstration(s) of compliance (if known). Provide this information as Attachment D."

- **Regulatory Discussion**
 - A. Applicability of New Source Review (NSR) Regulations
 - B. Applicability of Federal Regulations
 - C. Applicability of Source Aggregation
 - D. Applicability of State Regulations
-

Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
Application for 45CSR13 Modification Permit

Attachment D
REGULATORY DISCUSSION

A. Applicability of New Source Review (NSR) Regulations

The following New Source Review (NSR) regulations are potentially applicable to natural gas production facilities. Applicability to the subject facility has been determined as follows:

1. Prevention of Significant Deterioration (PSD) [Not Applicable]

This rule does not apply. The facility is a "PSD Minor Source" for each regulated pollutant, as follows:

- NOx: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- CO: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- VOC: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- SO2: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- PM10/2.5: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- CO2e: PSD Natural Minor Source with Pre-Controlled PTE < 100,000 tpy

2. Non-Attainment New Source Review (NNSR) [Not Applicable]

This rule does not apply. The facility location is designated as either "Maintenance" or "Attainment/Unclassified" for all criteria pollutants.

3. Major Source of Hazardous Air Pollutants (HAPs) [Not Applicable]

This rule does not apply. The facility qualifies as a "HAP Area Source" as follows:

- Each HAP: HAP Area Source with Pre-Controlled Individual HAP PTE < 10 tpy
- Total HAPs: HAP Area Source with Pre-Controlled Total of All HAPs PTE < 25 tpy

4. Title V Operating Permit (TVOP) [Not Applicable]

This rule does not apply. The facility qualifies as a "Title V Minor Source" as follows:

- NOx: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- CO: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- VOC: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- SO2: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- PM10/2.5: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- Each HAP: Title V Natural Minor Source with Pre-Controlled PTE < 10 tpy
- Total HAPs: Title V Natural Minor Source with Pre-Controlled PTE < 25 tpy

B. Applicability of Federal Regulations

The following federal regulations are potentially applicable to natural gas production facilities. Applicability to the facility has been determined as follows:

1. NSPS A, General Provisions

40CFR§60.1-§60.19

[Applicable]

This rule does apply to the reciprocating engine and compressor at the subject facility. Requirements include monitoring, recordkeeping and reporting.

2. NSPS Dc, Steam Generating Units

40CFR§60.40c-§60.48c

[Not Applicable]

This rule does not apply because there is no steam generating unit at the facility with a maximum design heat input capacity ≥ 10 MMBtu/hr and ≤ 100 MMBtu/hr (§60.40c(a)).

3. NSPS Kb, Volatile Organic Liquid Storage Vessels

40CFR§60.110b-§60.117b

[Not Applicable]

This rule does not apply because there is no tank used to store volatile organic liquids (VOL) with a design capacity ≥ 75 m³ (19,815 gal, 471.79 bbl) (§60.110b(a)).

4. NSPS GG, Stationary Gas Turbines

40CFR§60.330-§60.335

[Not Applicable]

This rule does not apply because there is no stationary gas turbine at the facility (§60.330).

5. NSPS KKK, Leaks from Natural Gas Processing Plants

40CFR§60.630-§60.636

[Not Applicable]

This rule does not apply because the facility is not a natural gas processing plant (§60.630(b)).

6. NSPS LLL, Onshore Natural Gas Processing: SO₂ Emissions

40CFR§60.640-§60.648

[Not Applicable]

This rule does not apply because there is no gas sweetening operation at the facility (§60.640(a)).

7. NSPS IIII, Compression Ignition Reciprocating Internal Combustion Engines

40CFR§60.4200-§60.4219

[Not Applicable]

This rule does not apply because there is no stationary compression ignition engine at the facility (§60.4200(a)).

8. NSPS JJJJ, Stationary Spark Ignition (SI) Internal Combustion Engines (ICE)
40CFR§60.4230-§60.4248 [Applicable]

This rule does apply to the 203 bhp Caterpillar G3306TA compressor engine (CE-01) because its maximum engine power is less than 500 HP and manufactured on or after 07/01/08 (§60.4230(a)(4)(iii)).

Requirements include NO_x, CO and VOC emission limits (§60.4233(e-f)); operating limits (§60.4243); performance testing (§60.4244); and notification and recordkeeping (§60.4245).

9. NSPS KKKK, Stationary Combustion Turbines
40CFR§60.4300-§60.4420 [Not Applicable]

This rule does not apply because there is no stationary combustion turbine at the (§60.4300).

10. NSPS OOOO, Crude Oil and Natural Gas Production
40CFR§60.5360-§60.5430 [Applicable]

This rule does apply to the reciprocating compressor because it commenced construction after 08/23/11 (§60.5360 and §60.5365(c)). Requirements include replacing rod packing systems on a specified schedule; also monitoring, recordkeeping and reporting requirements.

This rule does not apply to the pneumatic controllers because they are located between the wellhead and point of custody transfer, are not located at a natural gas processing plant, and their bleed rate is ≤ 6 scfh (§60.5365(d)(i)).

This rule does not apply to the storage vessels because they each have a VOC PTE < 6 tpy (§60.5395). However, records of VOC emissions must be retained to demonstrate continuing exemption status (§60.5420(b)(6)(ii) and (§60.5420 (c)(5)(ii)).

11. NESHAP A, General Provisions
40CFR§63.1-§63.16 [Applicable]

This rule does apply to the 203 bhp Caterpillar G3306TA compressor engine (CE-1) and the 7.0 MMscfd TEG Dehydrator (RSV-1) because they are subject to NESHAP Subparts ZZZZ and HH. Requirements include notification and recordkeeping.

12. NESHAP HH, Oil and Natural Gas Production Facilities
40CFR§63.760-§63.779 [Applicable]

This rule does apply to the 7.0 MMscfd TEG Dehydrator (RSV-1). However, because the TEG dehydrator has a benzene PTE < 0.9 megagrams per year, it is exempt from all requirements except to maintain records of actual annual average benzene emissions to demonstrate continuing exemption status (§63.764(e)(1)).

This rule does not apply to storage vessels (tanks), compressors, or ancillary equipment because the facility is an area source of HAP emissions (§63.760(b)(2)). In no case does this rule apply to engines or turbines.

13. NESHAP HHH, Natural Gas Transmission and Storage Facilities

40CFR§63.1270-§63.1289

[Not Applicable]

This rule does not apply because the facility is not a natural gas transmission or storage facility transporting or storing natural gas prior to local distribution (§63.1270(a)).

14. NESHAP YYYY, Stationary Combustion Turbines

40CFR§63.6080-§63.6175

[Not Applicable]

This rule does not apply because there is no stationary gas turbine at the facility (§63.6080).

15. NESHAP ZZZZ, Stationary Reciprocating Internal Combustion Engines (RICE)

40CFR§63.6580-§63.6675

[Applicable]

This rule does apply to the compressor engine; however, because it is "new"; i.e., commenced construction or reconstruction on or after 06/12/06 (§63.6590(a)(2)(iii)), the only requirement is compliance with 40CFR§60.4230-§60.4248 (NSPS JJJJ) for Spark Ignition Internal Combustion Engines.

16. NESHAP DDDDD, Industrial, Commercial, and Institutional Boilers and Process Heaters – Major Sources

40CFR§63.7480 – §63.7575

[Not Applicable]

This rule does not apply because the facility is not a major source of HAP (§63.7485).

17. NESHAP JJJJJ, Industrial, Commercial, and Institutional Boilers and Process Heaters – Area Sources

40CFR§63.11193 – §63.11237

[Not Applicable]

This rule does not apply because gas-fired boilers are not subject to the requirements of this subpart (§63.11195(e)). Specifically, "boiler" is defined as an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam and/or hot water.

18. Chemical Accident Prevention Provisions

40CFR§68.1-§68.220

[Not Applicable]

This rule does not apply because the facility does not store more than a threshold quantity of a regulated substance in a process (§68.115).

19. Compliance Assurance Monitoring (CAM)

40CFR§64.1-§64.10

[Not Applicable]

This rule does not apply. Although there are pollutant specific emission units subject to an emissions limitation and a control device is used to achieve compliance, the potential pre-control emissions do not exceed 100 tpy.

20. Mandatory Greenhouse Gases (GHG) Reporting

40CFR§98.1-§98.9

[Not Applicable]

This rule does not apply. The facility is not subject to a listed source category and the aggregate maximum heat input capacity is < 30 MMBtu/hr from all stationary fuel combustion sources combined (§98.2(a)).

C. Applicability of Source Aggregation

For New Source Review (NSR) and Title V permitting, the three-part regulatory criteria to determine whether emissions from two or more facilities should be aggregated and treated as a single source is whether the activities:

- i) Belong to the same industrial grouping; and
- ii) Are located on one or more contiguous or adjacent properties; and
- iii) Are under control of the same person (or persons under common control).

i) Same Industrial Grouping

The subject facility shares the same two-digit major SIC code of 13 as the upstream gas production wells and other Williams' facilities.

ii) Contiguous or Adjacent

The determination of whether two or more facilities are "contiguous" or "adjacent" is made on a case-by-case basis. This determination is proximity based, and it is important to focus on this criterion and whether two contiguous or adjacent facilities, considered as a single source, meet the common sense notion of a plant. The functional interrelationship of the two or more facilities is not a relevant inquiry in determining whether the facilities are "contiguous" or "adjacent."

Neither West Virginia nor federal regulations define the terms "contiguous" or "adjacent." It is clear, however, that the determination of whether two or more facilities are "contiguous" or "adjacent" is based on the plain meaning of the terms "adjacent" and "contiguous", which consider the physical distance between the facilities. The term contiguous is defined in the dictionary as being in actual contact; touching along a boundary or at a point. The term adjacent" is defined in the dictionary as not distant, nearby, having a common endpoint or border.

The closest Williams-owned facility to the Taylor Compressor Station is the Oak Grove Gas Plant, which is located 1.3 miles away. The Oak Grove Gas Plant does not meet the common sense definition of being "contiguous" with or "adjacent" to the Taylor Compressor Station.

The Taylor Compressor Station compresses and dehydrates gas produced from an upstream production well located in northern West Virginia. The subject facility is located on a parcel that is directly adjacent to a pre-existing upstream production wellpad operated by Chevron and is located less than ½ mile from that wellpad.

The location of the subject facility was chosen because of suitable characteristics for construction and operation, such as the availability of a reasonably flat grade and accessibility for large trucks and equipment. Williams' business model is to construct scalable capacity that contemplates additional production from multiple operators and the initial configuration is merely a foundation for additional opportunities in the area. The subject facility does not need to be

located in the immediate vicinity of the upstream wells in order to operate properly. Had suitable land been available elsewhere, the subject facility could have been located farther from the upstream wells and could theoretically be moved farther from the wells without affecting operations. Therefore, despite the fact that the subject facility is located in close proximity to one or many upstream production sources, aggregation of the subject facility with upstream wells does not meet the common sense notion of a plant.

iii) Common Control

Williams OVM operates under its parent company The Williams Companies, Inc. (Williams) and is the sole operator of the subject facility. The closest Williams-operated facility to the subject facility is the Oak Grove Gas Plant, located approximately 1.3 miles away. This facility is the closest to Taylor to have common ownership but it is not "contiguous" with or "adjacent" to the Taylor facility.

The production wells, including the Chevron wellpad, that send natural gas to the subject facility are owned and operated by other companies, which are unaffiliated with Williams. Williams has no ownership stake in the Chevron wellpad or in any production well or company in West Virginia that may send natural gas to the subject facility.

Furthermore, neither Williams OVM, nor Williams, exercise operational control over any equipment owned or operated by any natural gas producer upstream of the subject facility. All employees at the subject facility are under the exclusive direction of Williams and are not under the control of any other entity. Similarly, Williams has no authority over employees of the production wells. These companies operate wholly independent of one another. No employees are expected to shuttle back and forth between the subject facility and any production well.

At this time, contracts are in place for the subject facility to process natural gas produced from multiple upstream production wells located throughout the region. As future commercial opportunities are identified, the subject facility will potentially receive gas from other producers. Williams will not have ownership or control of any future wellhead facilities. The producers are, and will be responsible for, any decisions to produce or shut-in wellhead facilities and have no control over the equipment installed, owned, and operated by Williams. Similarly, Williams cannot control the installation or operation of any equipment located at a well site that may be considered an air contamination source.

For the reason above, it is clear that Williams does not have common control of any production wells including the Chevron well.

Summary

The subject facility and the upstream production wells should not be aggregated and treated as a single source of emissions because the subject facility is not under common control with any of the upstream wells. Additionally, the subject facility and the upstream production wells, considered together, do not meet the common sense notion of a plant because the subject facility is expected to service multiple production wells and because the location of the facility was selected for reasons unrelated to the location of the production wells. Accordingly, the subject facility should not be aggregated with the upstream wells in determining major source or PSD status

D. Applicability of State Regulations

The following State regulations are potentially applicable to natural gas production facilities. Applicability to the facility has been determined as follows:

- 1. Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers**
45CSR2 [Applicable]

This rule does apply, however, because the dehydrator reboiler has a maximum design heat input (MDHI) rating < 10 MMBtu/hr, the only requirement is to limit visible emissions to < 10% opacity during normal operations (§45-02-3.1). The reboiler combusts only natural gas which inherently conforms to the visible emission standards.
- 2. Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors**
45CSR4 [Applicable]

This rule does apply and states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable. No odors have been deemed objectionable.
- 3. Control of Air Pollution from Combustion of Refuse**
45CSR6 [Not Applicable]

This rule does not apply because there is no refuse combustion performed at the facility.
- 4. Prevent and Control Air Pollution from the Emission of Sulfur Oxides**
45CSR10 [Not Applicable]

This rule does not apply because each "fuel burning unit" at the facility has a Maximum Design Heat Input (MDHI) rating < 10 MMBtu/hr.
- 5. Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation**
45CSR13 [Applicable]

This rule does apply. Williams OVM has received a 45CSR13 Permit for the subject facility and has published the required Class I legal advertisement notifying the public of this application to modify the existing permit.
- 6. Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants**
45CSR14 [Not Applicable]

The rule does not apply because the facility is neither a new major source of pollutants nor is the proposed modification a modification to an existing major source.
- 7. Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60**
45CSR16 [Applicable]

This rule does apply because the facility is subject to New Source Performance Standards (NSPS) Subpart OOOO.

- 8. Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment**
45CSR19 [Not Applicable]
This rule does not apply because the facility is a minor (or “deferred”) source of all regulated pollutants.
- 9. Requirements for Operating Permits**
45CSR30 [Not Applicable]
This rule does not apply because the facility is a minor (or “deferred”) source of all regulated pollutants.
- 10. Air Quality Management Fees Program**
45CSR22 [Applicable]
This rule does apply. It establishes a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources of air pollution.
- 11. Prevent and Control Emissions of Toxic Air Pollutants**
45CSR27 [Not Applicable]
This rule does not apply because equipment used in the production and distribution of petroleum products is exempt, provided that the product contains no more than 5% benzene by weight (§45-22-2.4).
- 12. Air Pollution Emissions Banking and Trading**
45CSR28 [Not Applicable]
This rule does not apply. The facility does not choose to participate in the voluntarily statewide air pollutant emissions trading program.
- 13. Emission Statements for VOC and NOX**
45CSR29 [Not Applicable]
This rule does not apply because facility is not located in Putnam, Kanawha, Cabell, Wayne, Wood, or Greenbrier Counties (§45-29-1).
- 14. Requirements for Operating Permits**
45CSR30 [Not Applicable]
This rule does not apply because the facility is a non-major “deferred” source of all regulated pollutants.
Pursuant to the authority granted in West Virginia 45CSR§30-3.2 and 45CSR§30A-3.1, the DAQ is extending the deferral, which was set to expire December 15, 2000, of non-major sources subject to West Virginia 45CSR30 (Title V Program) from the obligation to submit an operating permit application.

15. Emission Standards for Hazardous Air Pollutants (HAP)

45CSR34

[Not Applicable]

This rule does not apply because the provisions under Subparts HH and ZZZZ of 40 CFR Part 63 which apply to non-major area sources of hazardous air pollutants are excluded.

ATTACHMENT E

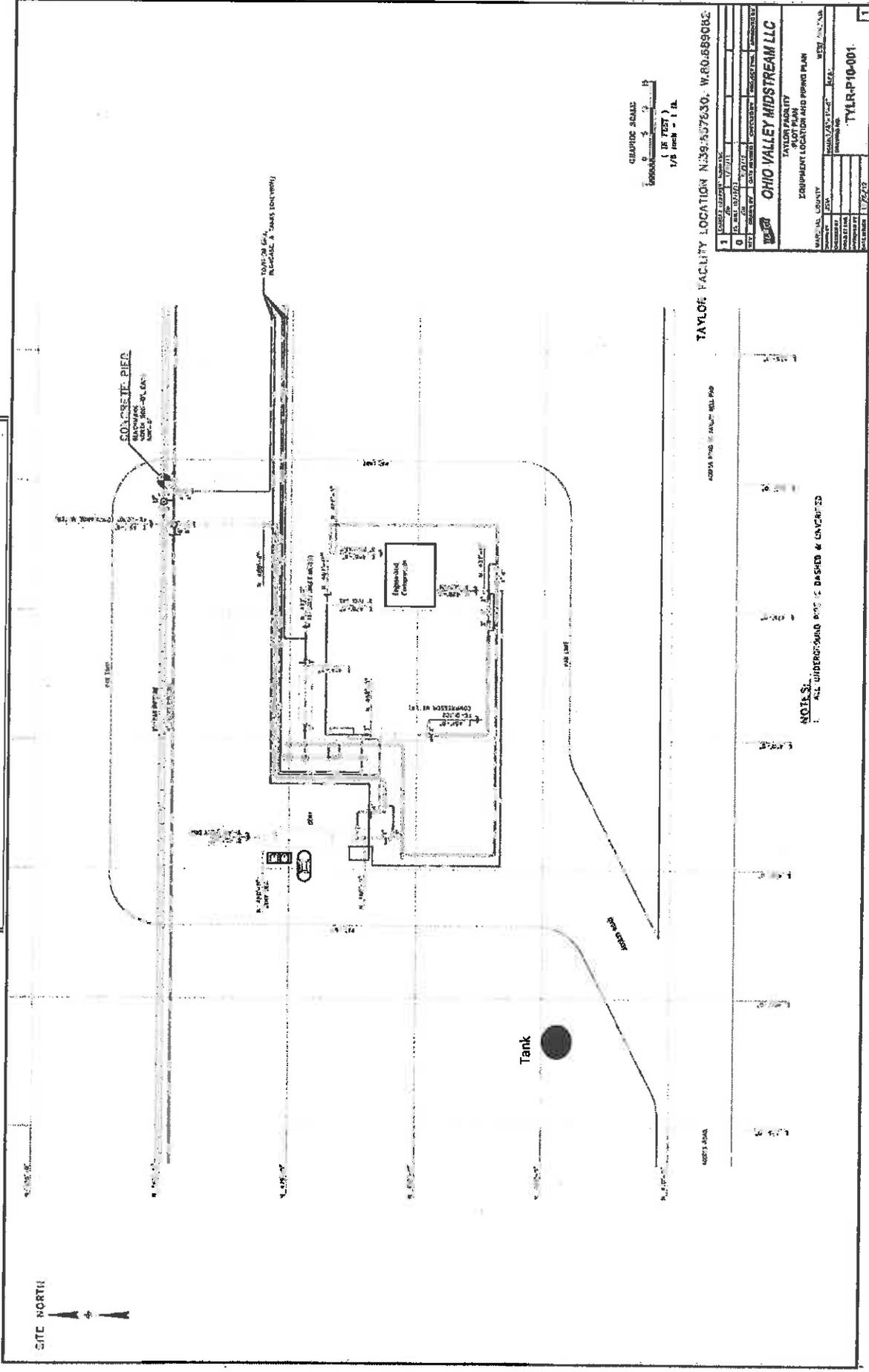
Plot Plan

"21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as Attachment E."

- **Plot Plan**
-

Williams Ohio Valley Midstream LLC (OVM)
TAYLOR COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit

Attachment E - Plot Plan



GRAPHIC SCALE
 1/8" = 1'-0"
 (SEE FIG. 1)

PROJECT INFORMATION	
PROJECT NO.	TYLR-P10-001
DATE	11/27/13
SCALE	AS SHOWN
OWNER INFORMATION	
OWNER	OHIO VALLEY MIDSTREAM LLC
ADDRESS	TAYLOR FACILITY
CITY	TAYLOR, OHIO
COUNTY	DEWEES COUNTY
STATE	OHIO
PROJECT DESCRIPTION	
PROJECT NAME	EQUIPMENT LOCATION AND PIPING PLAN
PROJECT NO.	TYLR-P10-001
DATE	11/27/13

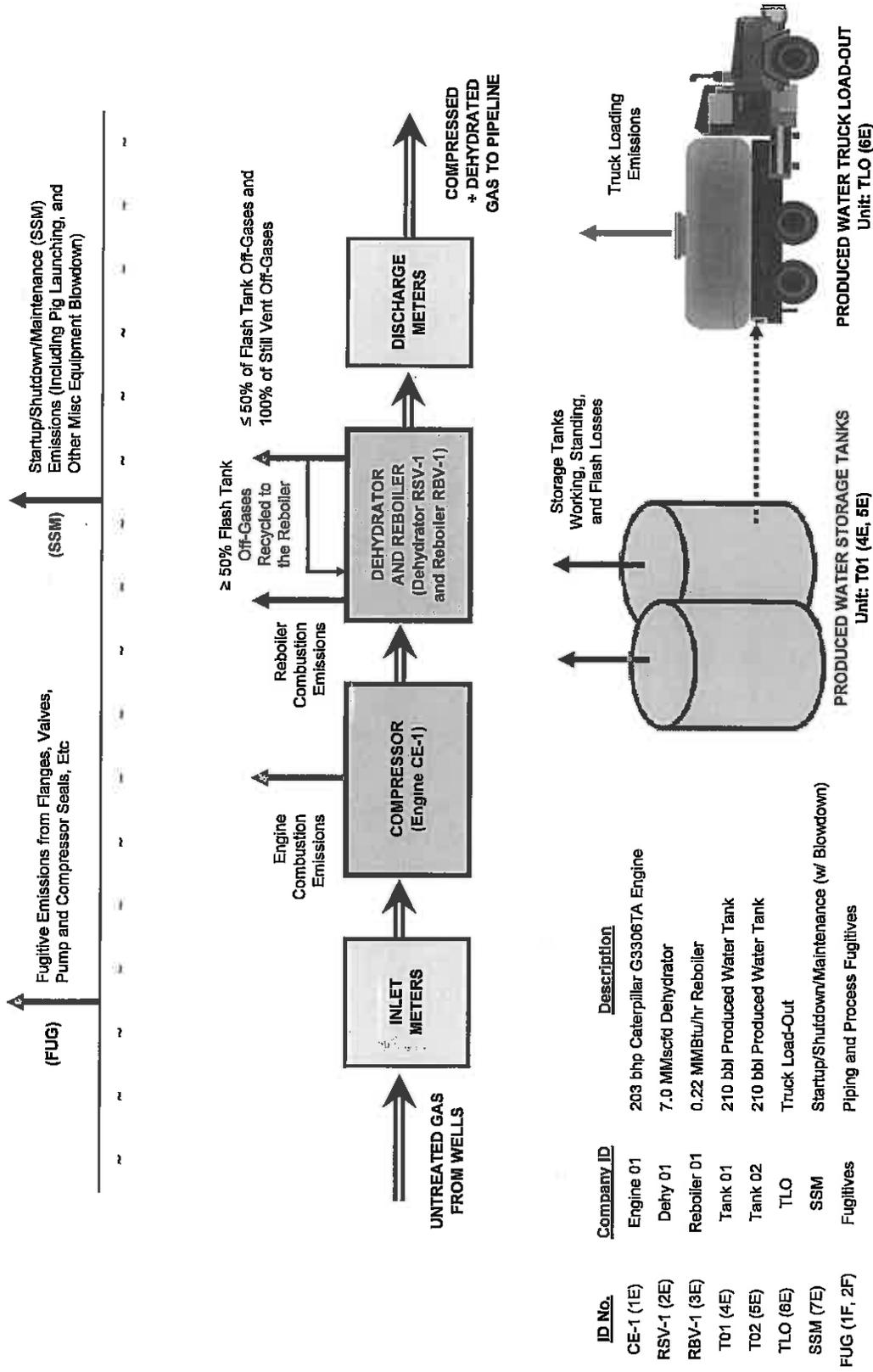
NOTES:
 1. ALL UNDERGROUND PIPING IS BASED & CENTERED

ATTACHMENT F
Detailed Process Flow Diagram

"22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as Attachment F."

- **Process Flow Diagram (PFD)**
-

Attachment F - Process Flow Diagram (PFD)



ID No.	Company ID	Description
CE-1 (1E)	Engine 01	203 bhp Caterpillar G3306TA Engine
RSV-1 (2E)	Dehy 01	7.0 MMscfd Dehydrator
RBV-1 (3E)	Reboiler 01	0.22 MMBtu/hr Reboiler
T01 (4E)	Tank 01	210 bbl Produced Water Tank
T02 (5E)	Tank 02	210 bbl Produced Water Tank
TLO (6E)	TLO	Truck Load-Out
SSM (7E)	SSM	Startup/Shutdown/Maintenance (w/ Blowdown)
FUG (1F, 2F)	Fugitives	Piping and Process Fugitives

ATTACHMENT G

Process Description

“23. Provide a **Process Description** as Attachment G. Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable). “

- **Process Description**
 - A. Project Overview
 - B. Compressor Engine
 - C. Triethylene Glycol (TEG) Dehydrator
 - D. Triethylene Glycol (TEG) Reboiler
 - E. Storage Tanks
 - F. Truck Load-Out
 - G. Startup/Shutdown/Maintenance
 - H. Compressor Rod Packing and Crankcase Emission
 - I. Piping and Equipment Fugitive Emissions
-

Williams Ohio Valley Midstream LLC
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Attachment G
PROCESS DESCRIPTION

A. Project Overview

Williams Ohio Valley Midstream LLC owns and operates the existing Taylor Compressor Station located off Fork Ridge Road approximately 5 miles SE of Moundsville in Marshall County (See Appendix B – Site Location Maps). The facility receives natural gas from local production wells then compresses and dehydrates the gas for delivery to a gathering pipeline.

This application is prepared and submitted to update the existing permit to reflect actual construction and operations, as follows:

- Increased Dehydration Unit throughput capacity;
- Corrected calculations to show no Still Vent Condenser on the Dehydration Unit;
- Used more conservative Dehydrator Operation parameters (temp and pressure);
- Included Rod Packing and Crankcase Emissions;
- Included Water/Oil Fugitive Emissions;
- Updated Extended Gas Analysis; and
- Updated emission factors and other emission estimating protocols

B. Compressor Engine

One (1) natural gas-fueled compressor engine is utilized at the facility. The lean-burn engine (CE-01) drives a natural gas compressor to increase the pressure of the natural gas. Emissions result from the combustion of natural gas fuel.

C. Tri-Ethylene Glycol (TEG) Dehydrator

One (1) Triethylene Glycol (TEG) Dehydrator is utilized at the facility. The dehydrator is comprised of a Contactor/Absorber Tower (no vented emissions), a Flash Tank, and a Regenerator/Still Vent.

The TEG Dehydrator is used to remove water vapor from the inlet wet gas stream to meet pipeline specifications. In the dehydration process, the wet inlet gas stream flows through a contactor tower where the gas is contacted with lean glycol. The lean glycol absorbs the water in the gas stream and becomes rich glycol laden with water and trace amounts of hydrocarbons.

The rich glycol is then routed to a flash tank where the glycol pressure is reduced to liberate the lighter end hydrocarbons (especially methane). Whenever practical, the lighter end hydrocarbons are routed from the flash tank to the Reboiler for use as fuel; otherwise these off-gases are vented to the atmosphere.

The rich glycol is then sent from the flash tank to the regenerator/still where the TEG is heated to drive off the water vapor and any remaining hydrocarbons. Once boiled, the glycol is returned to a lean state and used again in the process.

D. Tri-Ethylene Glycol (TEG) Reboiler

Tri-Ethylene Glycol (TEG) Reboiler is utilized to supply heat for the Triethylene Glycol (TEG) Regenerator/Still Vent.

E. Storage Tanks

There are tanks at the facility used to store various materials, including produced water, lube oil, fresh and spent TEG, etc. All of these tanks, except for the produced water storage tanks, generate de-minimis (insignificant) emissions.

The produced water tanks receive liquids from the dehydrator and inlet separator. Liquids removed through the dehydration process are cooled, condensed and sent to the 210 barrel atmospheric storage tanks (T01 and T02). The inlet separator removes produced fluids (primarily water) and these liquids are also sent to the 210 bbl atmospheric storage tanks.

A ProMax simulation of the Taylor Compressor Station was completed to determine the presence of flash emissions from the storage tanks. The ProMax process simulation showed minimal tank flash emissions and these losses are included in the emission estimates. Additionally, blanket gas may be used on the produced water tank to prevent air from entering the tank and potentially causing an explosion.

F. Truck Load-Out

Loading of produced water into tanker trucks will produce small quantities of VOC emissions from the displacement of vapors inside the tanker trucks (TLO).

G. Startup/Shutdown/Maintenance

During routine operation of the facility, the compressor engine will undergo periods of startup and shutdown. Often when the engine is shutdown, the natural gas contained within the compressor and associated piping is vented to atmosphere. Additionally, there will be other infrequent and (often) de-minimis emissions from various maintenance activities at the facility that are not necessarily associated with compressor blowdowns.

H. Compressor Rod Packing and Crankcase Emissions

The compressor and engine operation results in emissions from the wear of mechanical joints, seals, and rotating surfaces over time.

I. Piping and Equipment Fugitive Emissions

Piping and process equipment generate from leaks from different component types (connectors, valves, pumps, etc.) in gas-vapor service and water/oil service.

ATTACHMENT H
Material Safety Data Sheets (MSDS)
(And Representative Gas Analysis)

"24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as Attachment H. For chemical processes, provide a MSDS for each compound emitted to the air."

- **NATURAL GAS**
 - Natural Gas Composition
 - Extended Gas Analysis

 - **MATERIAL SAFETY DATA SHEETS (MSDS):**
 - Natural Gas
 - Triethylene Glycol (TEG)
 - Produced Water/Condensate
-

Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
 Attachment H

INLET GAS COMPOSITION - SUMMARY

Representative Inlet Gas Composition (Taylor CS - Sampled 08/12/14)

Compound	CAS	Formula	Molecular Weight (MW)	Mole % (M% = V%)	Mole Fraction (M%/Sum-M%)	Weighted Sum (MW*MF)	Weight % (WS/Sum-WS)	lb/MMscf (WS/UGC#)
Nitrogen	7727-37-9	N2	28.013	0.3936	0.003936	0.1103	0.4978	290.55
Hydrogen Sulfide	2148-87-8	H2S	34.086	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.010	0.1328	0.001328	0.0584	0.2639	154.01
Methane*	75-82-8	CH4	16.042	72.0408	0.720401	11.5570	52.1806	30,454.67
Ethane*	74-84-0	C2H6	30.069	17.7791	0.177789	5.3460	24.1373	14,087.50
Propane**	74-98-6	C3H8	44.096	5.8624	0.058623	2.5850	11.6716	6,812.01
i-Butane**	75-28-5	C4H10	58.122	0.7029	0.007029	0.4085	1.8446	1,076.56
n-Butane**	106-97-8	C4H10	58.122	1.7059	0.017059	0.9915	4.4767	2,612.76
Cyclopentane**	287-92-3	C5H10	70.100	0.0000	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.149	0.3976	0.003976	0.2869	1.2952	755.93
n-Pentane**	109-66-0	C5H12	72.149	0.4748	0.004748	0.3426	1.5467	902.70
Cyclohexane**	110-82-7	C6H12	84.159	0.0286	0.000286	0.0241	0.1087	63.43
Other Hexanes**	varies	C6H14	86.175	0.1940	0.001940	0.1672	0.7548	440.54
Methylcyclohexane**	varies	C7H14	98.186	0.0166	0.000166	0.0163	0.0736	42.95
Heptanes**	varies	C7H16	100.202	0.0984	0.000984	0.0986	0.4452	259.82
C8+ Heavies**	varies	C8+	114.229	0.0206	0.000206	0.0235	0.1062	62.01
Benzene***	71-43-2	C6H6	78.112	0.0022	0.000022	0.0017	0.0078	4.53
Ethylbenzene***	100-41-4	C8H10	106.165	0.0005	0.000005	0.0005	0.0024	1.40
n-Hexane***	110-54-3	C6H14	86.175	0.1454	0.001454	0.1253	0.5657	330.18
Toluene***	108-88-3	C7H8	92.138	0.0031	0.000031	0.0029	0.0129	7.53
2,2,4-TMP (i-octane)***	540-84-1	C8H18	114.229	0.0005	0.000005	0.0006	0.0026	1.51
Xylenes***	1330-20-7	C8H10	106.165	0.0012	0.000012	0.0013	0.0058	3.36

Totals:	100.00	1.0000	22.1481	100.00	58,363.95
THC:	99.47	0.9947	21.9794	99.24	57,919.39
Total VOC:	9.65	0.0965	5.0764	22.92	13,377.22
Total HAP:	0.15	0.0015	0.1322	0.60	348.50

* = Hydrocarbon (HC) ** = also Volatile Organic Compound (EPA-VOC) *** = also Hazardous Air Pollutant (EPA-HAP)

#UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 °F and 14.696 psia. Pound "X"/scf = M% of "X" * MW of "X" / UGC

To be conservative, the following "worst-case" values were assumed:

Compound	CAS	Formula	Representative Gas Analysis			Assumed "Worst-Case" Parameters		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	0.133	0.264	154.01	0.172	0.343	200.00
Methane	75-82-8	CH4	72.041	52.181	30,454.67	87.524	75.000	37,000.00
Ethane	74-84-0	C2H6	17.779	24.137	14,087.50	21.455	25.000	17,000.00
VOC (Propane)	74-98-6	C3H8	9.655	22.920	13,377.22	11.620	27.586	16,100.00
Benzene	71-43-2	C6H6	0.0022	0.0078	4.53	0.0049	0.0171	10.00
Ethylbenzene	100-41-4	C8H10	0.0005	0.0024	1.40	0.0300	0.1500	10.00
n-Hexane	110-54-3	C6H14	0.1454	0.5657	330.18	0.1761	0.6854	400.00
Toluene	108-88-3	C7H8	0.0031	0.0129	7.53	0.0041	0.0171	10.00
2,2,4-TMP (i-octane)	540-84-1	C8H18	0.0005	0.0026	1.51	0.0050	0.0150	10.00
Xylenes	1330-20-7	C8H10	0.0012	0.0058	3.36	0.0300	0.1500	10.00
Total HAP	Various	C6 thru C8	0.1529	0.5971	348.50	0.1887	0.7368	430.00

Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
Attachment H

EXTENDED GAS ANALYSIS

Legacy Measurement Solutions

Good

Shreveport, LA
 318-226-7237

Customer	: 2259 - WILLIAMS	Date Sampled	: 08/12/2014
Station ID	: 52064-50	Date Analyzed	: 08/20/2014
Cylinder ID	: w7073	Effective Date	: 09/01/2014
Producer	: 001350-CHEVRON USA INC	Cyl Pressure	: 900
Lease	: TAYLOR MASTER	Temp	: 87
Area	: 500 - OHIO VALLEY MID	Cylinder Type	: Spot
State	: WV	Sample By	: JLR

<u>COMPONENT</u>	<u>MOL%</u>	<u>GPM@14.73(PsIA)</u>	<u>WT%</u>
Oxygen	0.0000	0.000	0.000
Nitrogen	0.3936	0.000	0.498
Methane	72.0408	0.000	52.183
Carbon-Dioxide	0.1328	0.000	0.264
Ethane	17.7791	4.773	24.138
Propane	5.8624	1.621	11.672
Iso-Butane	0.7029	0.231	1.845
Normal-Butane	1.7059	0.540	4.477
Iso-Pentane	0.3976	0.146	1.295
Normal-Pentane	0.4748	0.173	1.547
2,2-Dimethylbutane	0.0108	0.005	0.042
2,3-Dimethylbutane/CycloC5	0.0212	0.007	0.082
2-methylpentane	0.1012	0.042	0.394
3-methylpentane	0.0808	0.025	0.237
Normal-Hexane	0.1454	0.080	0.566
2,2-Dimethylpentane	0.0011	0.001	0.005
Methylcyclopentane	0.0159	0.006	0.060
BENZENE	0.0022	0.001	0.008
3,3-Dimethylpentane	0.0000	0.000	0.000
CYCLOHEXANE	0.0127	0.004	0.048
2-Methylhexane	0.0336	0.016	0.152
2,3-Dimethylpentane	0.0060	0.002	0.027
3-Methylhexane	0.0245	0.011	0.111
1,12-DMCYC5 / 2,2,4-TMC5	0.0000	0.000	0.000
1,13-Dimethylcyclopentane	0.0003	0.000	0.001
N-Heptane	0.0332	0.015	0.150
METHYLCYCLOHEXANE	0.0183	0.008	0.072
2,5-Dimethylhexane	0.0000	0.000	0.000
2,3-Dimethylhexane	0.0027	0.001	0.014
TOLUENE	0.0031	0.001	0.013
2-Methylheptane	0.0049	0.003	0.025
4-Methylheptane	0.0035	0.002	0.018
3-Methylheptane	0.0026	0.001	0.013
1,14-Dimethylcyclohexane	0.0018	0.001	0.009
N-OCTANE / 1,12-DMCYC6	0.0045	0.002	0.023
1,13-DMCYC6/1,C4-DMCYC6/1,C2,C3-TMCYC5	0.0000	0.000	0.000
2.4.4 TMC6	0.0000	0.000	0.000
2,6-Dimethylheptane / 1,C2-DMCYC6	0.0000	0.000	0.000
Ethylcyclohexane	0.0000	0.000	0.000
ETHYLBENZENE	0.0000	0.000	0.000
M-XYLENE	0.0012	0.001	0.006
P-XYLENE	0.0000	0.000	0.000
O-XYLENE	0.0000	0.000	0.000
NONANE	0.0006	0.000	0.003
N-DECANE	0.0000	0.000	0.000
N-UNDECANE	0.0000	0.000	0.000
TOTAL	100.0000	7.699	99.996



SAFETY DATA SHEET

1. Identification

Product identifier **Natural Gas**
 Other means of identification **Not available.**
 Synonyms **Methane, Natural Gas Sweet, Fuel Gas, Petroleum Gas, Methyl Hydride**
 Recommended use **Fuel.**
 Recommended restrictions **None known.**

Manufacturer / Importer / Supplier / Distributor Information

Company name **Williams, Inc.**
 Address **One Williams Center
Tulsa, OK 74172
US**
 Telephone **800-688-7507**
 E-mail **enterpriseehs@williams.com**
 Emergency phone number **888-677-2370**

2. Hazard(s) identification

Physical hazards **Flammable gases** **Category 1**
Gases under pressure **Compressed gas**
 Health hazards **Not classified.**
 OSHA hazard(s) **Simple asphyxiant**

Label elements

Hazard symbol



Signal word

Danger

Hazard statement

Extremely flammable gas. Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.

Precautionary statement

Prevention

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Response

Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage

Protect from sunlight. Store in a well-ventilated place.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)

Not classified.

3. Composition/information on ingredients

Substance

Hazardous components

Chemical name

Common name and synonyms

CAS number

%

Natural gas

8006-14-2

100

Composition comments

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation

Move injured person into fresh air and keep person calm under observation. If breathing is difficult, give oxygen. Get medical attention if any discomfort continues.

Skin contact

Frostbite: Do not remove clothes, but flush with copious amounts of lukewarm water. Call an ambulance and continue to flush during transportation to hospital.

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.

Natural Gas

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Ingestion	This material is a gas under normal atmospheric conditions and ingestion is unlikely.
Most important symptoms/effects, acute and delayed	Narcosis. Behavioral changes. Decrease in motor functions.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General Information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Extinguish with foam, carbon dioxide, dry powder or water fog.
Unsuitable extinguishing media	None.
Specific hazards arising from the chemical	Extremely flammable gas. Closed containers can burst violently when heated, due to excess pressure build-up. Gas may travel considerable distance to a source of ignition and flash back. Gases may form explosive mixtures with air. Fire or high temperatures create: Carbon monoxide, Carbon oxides, Sulfur oxides.
Special protective equipment and precautions for firefighters	Selection of respiratory protection for firefighting; follow the general fire precautions indicated in the workplace. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with full face-piece operated in positive pressure mode. Use approved gas detectors in confined spaces.
Fire-fighting equipment/instructions	Evacuate area. Move container from fire area if it can be done without risk. Stay away from ends of tanks. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect men attempting to stop a leak. Cool equipment exposed to flames with water, if it can be done without risk. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. Beware of accumulation in low areas or contained areas, where explosive concentrations may occur. Prevent from entering drains or any places where accumulation may occur. Ventilate well and allow to evaporate. Stay upwind. Avoid inhalation and contact with skin and eyes. For large spillages notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate personal protective equipment (See Section 8).
Methods and materials for containment and cleaning up	In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.
Environmental precautions	Stop leak if possible without any risk. Water may be useful in minimizing or dispersing vapors. If spill occurs on water notify appropriate authorities in accordance with all applicable regulations.

7. Handling and storage

Precautions for safe handling	Keep away from sources of ignition - No smoking. Take precautionary measures against static discharges. Observe good industrial hygiene practices. Wear appropriate personal protective equipment (See Section 8).
	Contents under pressure. Gas can accumulate in confined spaces and limit oxygen available for breathing. Use only with adequate ventilation. Use non-sparking hand tools and explosion-proof electrical equipment. The product can accumulate electrostatic charges, which may cause an electrical spark (ignition source). Ground container and transfer equipment to eliminate static electric sparks. Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, hydrogen sulfide (H ₂ S) and flammability. Cold burns may occur during filling operations. Containers and delivery lines may become cold enough to present cold burn hazard.
	The use hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of incomplete combustion products (e.g. carbon monoxide, oxides of sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels.

Conditions for safe storage, including any incompatibilities

Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post areas "No Smoking or Open Flame." Store away from incompatible materials. Protect against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

Empty containers may contain flammable product residues. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value
Natural gas (CAS 8006-14-2)	TWA	1000 ppm

Biological limit values	No biological exposure limits noted for the ingredient(s).
Exposure guidelines	No exposure standards allocated.
Appropriate engineering controls	Provide shower facilities near the work place. In confined spaces, make sure the area is well-ventilated and sufficient oxygen (19.5%) exists before entry. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Use explosion-proof equipment.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Wear approved safety glasses as a good hygiene practice.
Skin protection	
Hand protection	Wear suitable gloves as a good hygiene practice.
Other	Wear suitable protective clothing.
Respiratory protection	A NIOSH approved, self-containing breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH). A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance	Colorless gas.
Physical state	Gas Compressed.
Form	Gas.
Color	Colorless.
Odor	Odorless to slight, sweet.
Odor threshold	Not available.
pH	Not applicable.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	-259.6 °F (-162 °C)
Flash point	-304.6 °F (-187 °C)
Evaporation rate	Not available.
Flammability (solid, gas)	Extremely flammable gas.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	5 %
Flammability limit - upper (%)	15 %
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.

Vapor pressure	40 mm Hg (77°F/25°C)
Vapor density	0,55 Approximate.
Relative density	Not available.
Solubility(ies)	Slightly soluble in water.
Partition coefficient (n-octanol/water)	1,81
Auto-ignition temperature	> 550,4 °F (> 288 °C)
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Percent volatile	100

10. Stability and reactivity

Reactivity	The product is non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable under normal temperature conditions and recommended use.
Possibility of hazardous reactions	Polymerization will not occur.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
Incompatible materials	Oxidizing agents.
Hazardous decomposition products	Carbon oxides. Sulfur oxides.

11. Toxicological Information

Information on likely routes of exposure

Ingestion	This material is a gas under normal atmospheric conditions and ingestion is unlikely.
Inhalation	High concentrations: Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. In high concentrations, vapors are narcotic and may cause headache, fatigue, dizziness and nausea.
Skin contact	Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.
Eye contact	Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.
Symptoms related to the physical, chemical and toxicological characteristics	Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn"). Contact with evaporating liquid may cause frostbite or freezing of skin. Symptoms of overexposure can include shortness of breath, drowsiness, headaches, confusion, decreased coordination, visual disturbances and vomiting, and are reversible if exposure is stopped. Continued exposure can lead to hypoxia (inadequate oxygen), rapid breathing, cyanosis (bluish discoloration of skin), numbness of the extremities, unconsciousness and death.

Information on toxicological effects

Acute toxicity	Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").
----------------	--

Product	Species	Test Results
Natural gas (CAS 8006-14-2)		
Acute		
Oral		
LD50	Rat	> 5 g/kg
Skin corrosion/irritation	Not classified.	
Serious eye damage/eye irritation	Not classified.	
Respiratory sensitization	Not classified.	
Skin sensitization	Not a skin sensitizer.	
Germ cell mutagenicity	Not classified.	
Carcinogenicity	Not classified.	
Reproductive toxicity	Not classified.	
Specific target organ toxicity - single exposure	Not classified.	
Specific target organ toxicity - repeated exposure	Not classified.	

Natural Gas

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Aspiration hazard Not applicable.
Chronic effects Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity Not expected to be harmful to aquatic organisms.
Persistence and degradability The hydrocarbons in this material are expected to be inherently biodegradable. In practice, hydrocarbon gases are not likely to remain in solution long enough for biodegradation to be a significant loss process. Hydrogen sulfide, if present in refinery gas streams, will be oxidized in water and insoluble sulfides precipitated from water when metallic radicals are present.
Bioaccumulative potential The product is not expected to bioaccumulate.
Partition coefficient n-octanol / water (log Kow)
Natural gas 1.81
Mobility in soil Not relevant, due to the form of the product.
Mobility in general The product is a volatile substance, which may spread in the atmosphere.
Other adverse effects The product is a volatile organic compound which has a photochemical ozone creation potential.

13. Disposal considerations

Disposal instructions This material is a gas and would not typically be managed as a waste.
Local disposal regulations Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.
Hazardous waste code D001
Waste from residues / unused products Dispose of in accordance with local regulations.
Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number UN1971
UN proper shipping name Natural gas, compressed
Transport hazard class(es) 2.1
Subsidiary class(es) Not available.
Packing group Not available.
Special precautions for user Not available.
Labels required 2.1
Packaging exceptions 308
Packaging non bulk 302
Packaging bulk 302

IATA

UN number UN1971
UN proper shipping name Natural gas, compressed
Transport hazard class(es) 2.1
Subsidiary class(es) -
Packing group Not available.
Environmental hazards No
Labels required 2.1
ERG Code 10L
Special precautions for user Not available.

IMDG

UN number UN1971
UN proper shipping name NATURAL GAS, COMPRESSED
Transport hazard class(es) 2.1
Subsidiary class(es) -
Packing group Not available.
Environmental hazards
Marine pollutant No
Labels required 2,1
EmS F-D, S-U
Special precautions for user Not available.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code No information available.

15. Regulatory Information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not on regulatory list.

CERCLA Hazardous Substance List (40 CFR 302.4)

Natural gas (CAS 8006-14-2)

LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - Yes
Pressure Hazard - Yes
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

No

SARA 311/312 Hazardous chemical

Yes

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)

Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA)

Not regulated.

US state regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Natural gas (CAS 8006-14-2)

US. New Jersey Worker and Community Right-to-Know Act

Not regulated.

US. Pennsylvania RTK - Hazardous Substances

Natural gas (CAS 8006-14-2)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No

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Country(s) or region	Inventory name	On inventory (yes/no)*
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

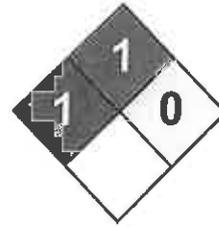
16. Other information, including date of preparation or last version

Issue date	11-08-2012
Revision date	-
Version #	01
Further Information	Not available.
References	Registry of Toxic Effects of Chemical Substances (RTECS)

Disclaimer
This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.



Science Lab.com
Chemicals & Laboratory Equipment



Health	1
Environment	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet Triethylene glycol MSDS

Section 1: Chemical Product and Company Identification

Product Name: Triethylene glycol

Catalog Codes: SLT2644

CAS#: 112-27-6

RTECS: YE4550000

TSCA: TSCA 8(b) inventory: Triethylene glycol

Cl#: Not available.

Synonym: 2,2'-[1,2-Ethanediy]bis(oxy)]bisethanol

Chemical Formula: C₆H₁₄O₄

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Triethylene glycol	112-27-6	100

Toxicological Data on Ingredients: Triethylene glycol: ORAL (LD50): Acute: 17000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion. Slightly hazardous in case of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

Very hazardous in case of eye contact (irritant). Slightly hazardous in case of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, the nervous system. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact: No known effect on skin contact, rinse with water for a few minutes.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 371°C (699.8°F)

Flash Points: CLOSED CUP: 177°C (350.6°F). OPEN CUP: 165.5°C (329.9°F).

Flammable Limits: LOWER: 0.9% UPPER: 9.2%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Avoid contact with eyes. If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Splash goggles. Lab coat.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Hygroscopic liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 150.18 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 285°C (545°F)

Melting Point: -5°C (23°F)

Critical Temperature: Not available.

Specific Gravity: 1.1274 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 5.17 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 17000 mg/kg [Rat].

Chronic Effects on Humans: The substance is toxic to kidneys, the nervous system.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion. Slightly hazardous in case of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Triethylene glycol TSCA 8(b) inventory: Triethylene glycol

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC): R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Not applicable. Lab coat. Not applicable. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:31 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



MATERIAL SAFETY DATA SHEET

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name: Natural Gas Condensate

Synonyms: Condensate, Gas Condensate, Distillate, Pipeline Drip, Natural gasoline, Casinghead gasoline, Straight-run gasoline, Isoparaffin mixture, and Drip gas

Manufacturer Name:
Williams, Inc.
One Williams Center
Tulsa, OK 74172
USA

Emergency Telephone:
888-677-2370

Non-emergency Telephone:
800-688-7507

Intended Use: Industrial use

2 HAZARDS IDENTIFICATION

Emergency Overview

Physical State: Liquid

Color: Colorless to brownish-black

Odor: Petroleum

DANGER!

Harmful if inhaled or absorbed through skin. Harmful if swallowed - may enter lungs if swallowed or vomited. Causes skin and eye irritation. High vapor concentrations may cause drowsiness and irritation of the eyes or respiratory tract.

Extremely flammable liquid and vapor - vapor may cause flash fire.

Potential Health Effects

Inhalation: Harmful if inhaled. May cause central nervous system effects.

Eye Contact: Causes eye irritation. High vapor concentrations may cause irritation.

Skin Contact: Harmful if absorbed through skin. Causes skin irritation.

Ingestion: Harmful if swallowed - may enter lungs if swallowed or vomited.

Chronic Health Effects: Long-term exposure to condensate vapor has caused kidney and liver cancer in laboratory animals. Case reports of chronic condensate abuse (such as sniffing) and chronic misuse as a solvent or as a cleaning agent have shown a range of nervous system effects, sudden deaths from heart attacks, blood effects and leukemia. These effects are not expected to occur at exposure levels encountered in the distribution and use of condensate as a motor fuel. Prolonged and repeated exposure to benzene may

cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).

Target Organ(s): | Central nervous system | Eye | Kidney | Liver | Skin | Blood and/or blood-forming organs |

OSHA Regulatory Status: This product is hazardous according to OSHA 29CFR 1910.1200.

3 COMPOSITION / INFORMATION ON INGREDIENTS

General Information: Condensate is a complex mixture of volatile hydrocarbons, primarily in the C3 to C8 range. The composition varies depending on the natural gas source and processing, but typically includes some concentration of benzene.

Chemical Name	CAS-No.	Concentration*
†Natural gas condensates (petroleum)	68919-39-1	97.9 - 99.6%
†Benzene	71-43-2	0.4 - 2.1%

* All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

† This chemical is hazardous according to OSHA/WHMIS criteria.

4 FIRST AID MEASURES

Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Eye Contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention. In case of irritation from airborne exposure, move to fresh air. Get medical attention if symptoms persist.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Ingestion: Call a physician or poison control center immediately. DO NOT induce vomiting, if victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head lower than the hips to help prevent aspiration.

5 FIRE-FIGHTING MEASURES

Extinguishing Media: Extinguish with foam, carbon dioxide, dry powder or water fog.

Unsuitable Extinguishing Media: Not applicable.

Special Fire Fighting Procedures: Self-contained breathing apparatus and full protective clothing should be worn when fighting chemical fires. Use water spray to keep fire-exposed containers cool.

Unusual Fire & Explosion Hazards: Material will float and may ignite on surface of water. Vapors may travel considerable distance to a source of ignition and flash back. Vapors may cause a flash fire or ignite explosively.

Hazardous Combustion Products: Carbon Oxides

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear protective clothing as described in Section 8 of this safety data sheet.

Spill Cleanup Methods: Eliminate all ignition sources. **Small Liquid Spills:** Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. **Large Spillages:** Use water spray to disperse vapors and flush spill area. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

7 HANDLING AND STORAGE

Handling: Do not breathe mist or vapor. Do not get in eyes, on skin, on clothing. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling.

Storage: Keep away from heat, sparks and open flame. Keep container tightly closed and in a well-ventilated place. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids. Keep away from food, drink and animal feed. Store away from incompatible materials.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION**Exposure Limits:**

Chemical Name	Source	Type	Exposure Limits	Notes
Benzene	CA. Alberta OELs	STEL	16 mg/m ³ 5 ppm	Skin
Benzene	CA. Alberta OELs	TWA	3.2 mg/m ³ 1 ppm	Skin
Benzene	CA. British Columbia OELs	TWA	0.5 ppm	Skin
Benzene	CA. British Columbia OELs	STEL	2.5 ppm	Skin
Benzene	CA. Ontario OELs	STEL	2.5 ppm	
Benzene	CA. Ontario OELs	TWA	0.5 ppm	
Benzene	CA. Quebec OELs	TWA	3 mg/m ³ 1 ppm	
Benzene	CA. Quebec OELs	STEL	15.5 mg/m ³ 5 ppm	
Benzene	MEX. OELs	STEL	16 mg/m ³ 5 ppm	
Benzene	MEX. OELs	TWA	3.2 mg/m ³ 1 ppm	
Benzene	US. ACGIH TLV	STEL	2.5 ppm	Skin
Benzene	US. ACGIH TLV	TWA	0.5 ppm	Skin
Benzene	US. NIOSH Guide	IDLH	500 ppm	
Benzene	US. OSHA Spec. Reg.	OSHA Action level	0.5 ppm	
Benzene	US. OSHA Spec. Reg.	STEL	5 ppm	
Benzene	US. OSHA Spec. Reg.	TWA	1 ppm	
Benzene	US. OSHA Z-2 PEL	TWA	10 ppm	
Benzene	US. OSHA Z-2 PEL	Maximum concentration	50 ppm	
Benzene	US. OSHA Z-2 PEL	Ceiling	25 ppm	

Engineering Controls: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits.

If exposure limits have not been established, maintain airborne levels to an acceptable level.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Eye Protection: Wear safety glasses with side shields (or goggles). Wear a full-face respirator, if needed.

Hand Protection: Wear chemical-resistant gloves. Contact glove manufacturer for specific information.

Skin Protection: Wear appropriate chemical resistant clothing to prevent any possibility of skin contact.

Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Environmental Exposure Controls: Environmental manager must be informed of all major spillages.

9 PHYSICAL AND CHEMICAL PROPERTIES

Color: Colorless to brownish-black
Odor: Petroleum
Odor Threshold: No data available.
Physical State: Liquid
pH: Not applicable
Melting Point: No data available.
Freezing Point: No data available.
Boiling Point: 45°C (113°F) - 404°C (759°F)
Flash Point: <-18°C (0°F) (Approximate)
Evaporation Rate: >100 [vs. n-Butyl Acetate = 1]
Flammability (Solid): No data available.
Flammability Limit - Upper (%): 10 (Approximate)
Flammability Limit - Lower (%): 1 (Approximate)
Vapor Pressure: 51 mmHg - 857 mmHg @100°F [Reid]
Vapor Density (Air=1): > 1
Specific Gravity: 0.766 - 0.87
Solubility in Water: Negligible
Solubility (Other): No data available.
Partition Coefficient (n-Octanol/water): No data available.
Autoignition Temperature: No data available.
Decomposition Temperature: No data available.
Viscosity: < 1 cst @38°C
Percent Volatile: 100 %vol
Explosive Properties: No data available

10 STABILITY AND REACTIVITY

Stability: Stable under the prescribed storage conditions.

Conditions to Avoid: Keep away from heat, sparks and open flame. Prevent buildup of vapors or gases to explosive concentrations.

Incompatible Materials: Strong oxidizing agents.

Hazardous Decomposition Products: No data available.

11 TOXICOLOGICAL INFORMATION**Specified Substance(s)****Acute Toxicity:****Test Results:**

Chemical Name	Test Results
Natural gas condensates (petroleum)	Dermal LD50 (Rabbit): > 3750 mg/kg
Natural gas condensates (petroleum)	Inhalation LC50 (Rat): > 5.2 mg/l
Natural gas condensates (petroleum)	Oral LD50 (Rat): > 5000 mg/kg

Chronic Toxicity: Contains benzene. Human epidemiology studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-producing system and serious blood disorders, including leukemia. Animal tests suggest that prolonged and/or repeated overexposure to benzene may damage the embryo/fetus. The relevance of these animal studies to humans has not been fully established.

Listed Carcinogens:

Chemical Name	IARC	NTP	OSHA	ACGIH
Benzene	1	Listed	Listed	A1

IARC: 1 = Carcinogenic to Humans; 2A = Probably Carcinogenic to Humans; 2B = Possibly Carcinogenic to Humans; 3 = Not classifiable as to carcinogenicity to humans; 4 = Probably not carcinogenic to humans; Not listed = Not evaluated by IARC.

ACGIH: A1 = Confirmed Human Carcinogen; A2 = Suspected Human Carcinogen; A3 = Confirmed Animal Carcinogen; A4 = Not classifiable as a human carcinogen; A5 = Not suspected to be a human carcinogen; Not listed = Not evaluated by ACGIH.

Product Information**Acute Toxicity:**

Test Results: No test data available for the product.

Other Acute: Harmful if inhaled or absorbed through skin. Harmful if swallowed - may enter lungs if swallowed or vomited. Causes severe skin and eye irritation. High vapor concentrations may cause drowsiness and irritation of the eyes or respiratory tract.

Chronic Toxicity: Long-term exposure to gasoline vapor has caused kidney and liver cancer in laboratory animals. Case reports of chronic gasoline abuse (such as sniffing) and chronic misuse as a solvent or as a cleaning agent have shown a range of nervous system effects, sudden deaths from heart attacks, blood effects and leukemia. These effects are not expected to occur at exposure levels encountered in the distribution and use of gasoline as a motor fuel.

12 ECOLOGICAL INFORMATION

Ecotoxicity: There are no data on the ecotoxicity of this product.

Mobility: No data available.

Persistence and Degradability: No data available.

Bioaccumulation Potential: No data available.

13	DISPOSAL CONSIDERATIONS
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General Information: Dispose of waste and residues in accordance with local authority requirements.

Disposal Methods: No specific disposal method required.

Container: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14	TRANSPORT INFORMATION
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DOT

UN No.: UN1993

Proper Shipping Name: Flammable liquids, n.o.s. (Natural gas condensates)

Class: 3

Packing Group: II

Label(s): 3

TDG

UN No.: UN1993

Proper Shipping Name: Flammable liquid, n.o.s. (Natural gas condensates)

Class: 3

Packing Group: II

IATA

UN No.: UN1993

Proper Shipping Name: Flammable liquid, n.o.s. (Natural gas condensates)

Class: 3

Packing Group: II

Label(s): 3

IMDG

UN No.: UN1993

Proper Shipping Name: Flammable liquid, n.o.s. (Natural gas condensates)

Class: 3

Packing Group: II

EmS No.: F-E, S-E

15	REGULATORY INFORMATION
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Canadian Controlled Products Regulations: This product has been classified according to the hazard criteria of the Canadian Controlled Products Regulations, Section 33, and the MSDS contains all required information.

WHMIS Classification: B2, D2A, D2B

Mexican Dangerous Statement: This product is dangerous according to Mexican regulations.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-.1052):

Chemical Name	CAS-No.
Benzene	71-43-2

Inventory Status

This product or all components are listed or exempt from listing on the following inventory: TSCA

US Regulations

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Name	RQ
Benzene	10 lbs

SARA Title III

Section 302 Extremely Hazardous Substances (40 CFR 355, Appendix A): Not regulated.

Section 311/312 (40 CFR 370):

Acute (Immediate) Chronic (Delayed) Fire Reactive Pressure Generating

Section 313 Toxic Release Inventory (40 CFR 372):

Chemical Name	CAS-No.	Reporting threshold for other users	Reporting threshold for manufacturing and processing
Benzene	71-43-2	10000 lbs	25000 lbs

For reporting purposes: the De Minimis Concentration for a toxic chemical in a mixture is 0.1% for carcinogens as defined in 29 CFR 1910.1200(d)(4) or 1% for others.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
Not regulated.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3): Benzene

Drug Enforcement Act: Not regulated.

TSCA

TSCA Section 4(a) Final Test Rules & Testing Consent Orders: Not regulated.

TSCA Section 5(a)(2) Final Significant New Use Rules (SNURs) (40CFR 721, Subpt. E): Not regulated.

TSCA Section 5(e) PMN-Substance Consent Orders: Not regulated.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D): Not regulated.

State Regulations**California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): Benzene****Massachusetts Right-To-Know List: Benzene****Michigan Critical Materials List (Michigan Natural Resources and Environmental Protection Act (Act. 451 of 1994)): Benzene****Minnesota Hazardous Substances List: Benzene****New Jersey Right-To-Know List: Benzene****Pennsylvania Right-To-Know List: Benzene****Rhode Island Right-To-Know List: Benzene****16 OTHER INFORMATION****HAZARD RATINGS**

	Health Hazard	Fire Hazard	Instability	Special Hazard
NFPA	2	4	0	NONE

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

NFPA Label colored diamond code: Blue - Health; Red - Flammability; Yellow - Instability; White - Special Hazards

	Health Hazard	Flammability	Physical Hazard	Personal Protection
HMIS	2*	4	0	--

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe *- Chronic Health Effect

HMIS Label colored bar code: Blue - Health; Red - Flammability; Orange - Physical Hazards; White - Special

Issue Date: 31-Mar-2009**Supersedes Date:** 28-Jul-1999**SDS No.:** 1023419**Disclaimer:** This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

ATTACHMENT I
Emission Units Table

"25. Fill out the **Emission Units Table** and provide it as Attachment I."

- **Emissions Unit Table**
-

ATTACHMENT J
Emission Points Data Summary Sheet

"26. Fill out the **Emission Points Data Summary Sheet** (Table 1 and Table 2) and provide it as Attachment J."

- **Table 1 – Emissions Data**
 - **Table 2 – Release Parameter Data**
-

Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
Attachment J

EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPs)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)	
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr				
CE-1 (1E)	Upward Vertical Stack	Compressor Engine - Caterpillar G3306TA						8,760	NOX	7.42	32.48	0.89	3.90	Gas	Vendor	
		CO	7.42	32.48	1.78	7.80	Gas		Vendor							
		VOC	0.28	1.22	0.28	1.22	Gas		Vendor							
		SO2	1.1E-03	4.7E-03	1.1E-03	4.7E-03	Gas		AP-42							
		PM10/2.5	0.04	0.16	0.04	0.16	Solid/Gas		AP-42							
		Benzene	2.9E-03	0.01	2.9E-03	0.01	Gas		AP-42							
		Ethylbenzene	4.5E-05	2.0E-04	4.5E-05	2.0E-04	Gas		AP-42							
		HCHO	0.11	0.49	0.11	0.49	Gas		Vendor							
		n-Hexane	—	—	—	—	Gas		AP-42							
		Toluene	1.0E-03	4.5E-03	1.0E-03	4.5E-03	Gas		AP-42							
		2,2,4-TMP	—	—	—	—	Gas		AP-42							
		Xylenes	3.6E-04	1.6E-03	3.6E-04	1.6E-03	Gas		AP-42							
		Other HAP	0.02	0.08	0.02	0.08	Gas		AP-42							
Total HAP	0.13	0.58	0.13	0.58	Gas	AP-42										
CO2e	240	1,052	240	1,052	Gas	EPA										
RSV-1 (2E)	Upward Vertical Stack	TEG Dehydrator - Flash Tank & Still Vent						8,760	NOX	—	—	—	—	—	—	
		CO	—	—	—	—	—		—	—	—	—	—	—	—	
		VOC	12.40	54.29	12.40	54.29	Gas		Model							
		SO2	—	—	—	—	Gas		—							
		PM10/2.5	—	—	—	—	—		—							
		Benzene	0.21	0.91	0.21	0.91	Gas		Model							
		Ethylbenzene	0.09	0.41	0.09	0.41	Gas		Model							
		HCHO	—	—	—	—	Gas		Model							
		n-Hexane	0.46	2.00	0.46	2.00	Gas		Model							
		Toluene	0.44	1.92	0.44	1.92	Gas		Model							
		2,2,4-TMP	1.7E-03	0.01	1.7E-03	0.01	Gas		Model							
		Xylenes	0.30	1.32	0.30	1.32	Gas		Model							
		Other HAP	—	—	—	—	Gas		Model							
Total HAP	1.50	6.57	1.50	6.57	Gas	Model										
CO2e	342	1,498	342	1,498	Gas	Model										

EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ & HAPS	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)		
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr					
RBV-1 (3E)	Upward Vertical Stack	TEG Dehydrator - Reboiler						C	8,760	NOX	0.02	0.10	0.02	0.10	Gas	AP-42	
		CO	0.02	0.08	0.02	0.08	Gas			AP-42							
		VOC	1.2E-03	0.01	1.2E-03	0.01	Gas			AP-42							
		SO2	1.3E-04	5.7E-04	1.3E-04	5.7E-04	Gas			AP-42							
		PM10/2.5	1.7E-03	0.01	1.7E-03	0.01	Solid/Gas			AP-42							
		Benzene	4.6E-07	2.0E-06	4.6E-07	2.0E-06	Gas			AP-42							
		Ethylbenzene	---	---	---	---	---			---							
		HCHO	1.6E-05	7.1E-05	1.6E-05	7.1E-05	Gas			AP-42							
		n-Hexane	3.9E-04	1.7E-03	3.9E-04	1.7E-03	Gas			AP-42							
		Toluene	7.4E-07	3.2E-06	7.4E-07	3.2E-06	Gas			AP-42							
2,2,4-TMP	---	---	---	---	---	---											
Xylenes	---	---	---	---	---	---											
Other HAP	4.1E-07	1.8E-06	4.1E-07	1.8E-06	Gas	AP-42											
Total HAP	4.1E-04	1.8E-03	4.1E-04	1.8E-03	Gas	AP-42											
CO2e	26	115	26	115	Gas	EPA											
NOX	---	---	---	---	---	---											
CO	---	---	---	---	---	---											
VOC	0.02	0.19	0.02	0.19	Gas	Model											
SO2	---	---	---	---	---	---											
PM10/2.5	---	---	---	---	---	---											
Benzene	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
Ethylbenzene	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
HCHO	---	---	---	---	---	---											
n-Hexane	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
Toluene	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
2,2,4-TMP	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
Xylenes	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
Other HAP	---	---	---	---	---	---											
Total HAP	0.01	0.02	0.01	0.02	Gas	Model											
CO2e	0.15	7	0.15	7	Gas	EPA											
T01 & T02 (4E, 5E) EACH	Upward Vertical Stack	Storage Tank - Produced Water						C	8,760	NOX	0.02	0.10	0.02	0.10	Gas	AP-42	
		CO	0.02	0.08	0.02	0.08	Gas			AP-42							
		VOC	1.2E-03	0.01	1.2E-03	0.01	Gas			AP-42							
		SO2	1.3E-04	5.7E-04	1.3E-04	5.7E-04	Gas			AP-42							
		PM10/2.5	1.7E-03	0.01	1.7E-03	0.01	Solid/Gas			AP-42							
		Benzene	4.6E-07	2.0E-06	4.6E-07	2.0E-06	Gas			AP-42							
		Ethylbenzene	---	---	---	---	---			---							
		HCHO	1.6E-05	7.1E-05	1.6E-05	7.1E-05	Gas			AP-42							
		n-Hexane	3.9E-04	1.7E-03	3.9E-04	1.7E-03	Gas			AP-42							
		Toluene	7.4E-07	3.2E-06	7.4E-07	3.2E-06	Gas			AP-42							
2,2,4-TMP	---	---	---	---	---	---											
Xylenes	---	---	---	---	---	---											
Other HAP	4.1E-07	1.8E-06	4.1E-07	1.8E-06	Gas	AP-42											
Total HAP	4.1E-04	1.8E-03	4.1E-04	1.8E-03	Gas	AP-42											
CO2e	26	115	26	115	Gas	EPA											
NOX	---	---	---	---	---	---											
CO	---	---	---	---	---	---											
VOC	0.02	0.19	0.02	0.19	Gas	Model											
SO2	---	---	---	---	---	---											
PM10/2.5	---	---	---	---	---	---											
Benzene	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
Ethylbenzene	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
HCHO	---	---	---	---	---	---											
n-Hexane	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
Toluene	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
2,2,4-TMP	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
Xylenes	6.1E-04	3.2E-03	6.1E-04	3.2E-03	Gas	Model											
Other HAP	---	---	---	---	---	---											
Total HAP	0.01	0.02	0.01	0.02	Gas	Model											
CO2e	0.15	7	0.15	7	Gas	EPA											

EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPs)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)							
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr										
TLO (6E)	Upward Vertical Stack	Truck Load-Out - Produced Water								NOX												
														CO								
														VOC	0.52		0.52		0.52	Gas	AP-42	
														SO2								
														PM10/2.5								
														Benzene	0.02		0.02		0.02	Gas	AP-42	
														Ethylbenzene	0.02		0.02		0.02	Gas	AP-42	
														HCHO								
														n-Hexane	0.05		0.05		0.05	Gas	AP-42	
														Toluene	0.02		0.02		0.02	Gas	AP-42	
SSM (7E)	Varies	Startup/Shutdown/Maintenance								NOX												
														CO								
														VOC	3.28		3.28		3.28	Gas	MB	
														SO2								
														PM10/2.5								
														Benzene	1.2E-03		1.2E-03		1.2E-03	Gas	MB	
														Ethylbenzene	1.2E-03		1.2E-03		1.2E-03	Gas	MB	
														HCHO								
														n-Hexane	0.08		0.08		0.08	Gas	MB	
														Toluene	1.2E-03		1.2E-03		1.2E-03	Gas	MB	
						2,4-TMP	1.2E-03		1.2E-03		1.2E-03	Gas	MB									
						Xylenes	1.2E-03		1.2E-03		1.2E-03	Gas	MB									
						Other HAP																
						Total HAP	0.09		0.09		0.09	Gas	MB									
						CO2e	189		189		189	Gas	EPA									

EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPs)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)	
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr				
RPC (8E)	Upward Vertical Stack	Rod Packing/Crankcase Leaks														
									NOX							
									CO							
									VOC	1.12	4.89	1.12	4.89	Gas	Vendor	
									SO2							
									PM10/2.5							
									Benzene	5.0E-03	0.02	5.0E-03	0.02	Gas	MB	
									Ethylbenzene	5.0E-03	0.02	5.0E-03	0.02	Gas	MB	
									HCHO	2.7E-03	0.01	2.7E-03	0.01	Gas	MB	
									n-Hexane	5.0E-03	0.02	5.0E-03	0.02	Gas	MB	
							Toluene	5.0E-03	0.02	5.0E-03	0.02	Gas	MB			
							2,2,4-TMP	5.0E-03	0.02	5.0E-03	0.02	Gas	MB			
							Xylenes	5.0E-03	0.02	5.0E-03	0.02	Gas	MB			
							Other HAP									
							Total HAP	0.03	0.14	0.03	0.14	Gas	MB			
							CO2e	70	305	70	305	Gas	EPA			

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

- 1 Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.
- 2 Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (e.g., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).
- 3 List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS2, VOCs, H2S, Inorganics, Lead, Organics, O3, NO, NO2, SO2, SO3, all applicable Greenhouse Gases (including CO2 and methane), etc. DO NOT LIST H2, H2O, N2, O2, and Noble Gases.
- 4 Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
- 5 Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
- 6 Indicate method used to determine emission rate as follows:
 MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).
- 7 Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO2, use units of ppmv (see 45CSR10).

EMISSION POINTS DATA SUMMARY SHEET - Continued

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Specify VOCs & HAPs)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
Total Plant-Wide (w/o Fugitives)															
Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	NOX	7.44	32.58	0.91	3.99	Gas	Varies	
								CO	7.43	32.56	1.80	7.88	Gas	Varies	
								VOC	13.83	64.60	13.83	64.60	Gas	Varies	
								SO2	1.2E-03	5.3E-03	1.2E-03	5.3E-03	Gas	Varies	
								PM10/2.5	0.04	0.16	0.04	0.16	Solid/Gas	Varies	
								Benzene	0.22	0.97	0.22	0.97	Gas	Varies	
								Ethylbenzene	0.10	0.45	0.10	0.45	Gas	Varies	
								HCHO	0.11	0.50	0.11	0.50	Gas	Varies	
								n-Hexane	0.46	2.16	0.46	2.16	Gas	Varies	
								Toluene	0.45	1.97	0.45	1.97	Gas	Varies	
								2,2,4-TMP	0.01	0.05	0.01	0.05	Gas	Varies	
								Xylenes	0.31	1.36	0.31	1.36	Gas	Varies	
Other HAP	0.02	0.08	0.02	0.08	Gas	Varies									
Total HAP	1.68	7.57	1.68	7.57	Gas	Varies									
CO2e	678	3,172	678	3,172	Gas	Varies									
Total Plant-Wide (w/ Fugitives)															
Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	NOX	7.44	32.58	0.91	3.99	Gas	Varies	
								CO	7.43	32.56	1.80	7.88	Gas	Varies	
								VOC	16.07	74.39	16.07	74.39	Gas	Varies	
								SO2	0.00	0.01	0.00	0.01	Gas	Varies	
								PM10/2.5	0.04	0.16	0.04	0.16	Solid/Gas	Varies	
								Benzene	0.24	1.09	0.24	1.09	Gas	Varies	
								Ethylbenzene	0.13	0.57	0.13	0.57	Gas	Varies	
								HCHO	0.11	0.50	0.11	0.50	Gas	Varies	
								n-Hexane	0.59	2.71	0.59	2.71	Gas	Varies	
								Toluene	0.47	2.09	0.47	2.09	Gas	Varies	
								2,2,4-TMP	0.03	0.17	0.03	0.17	Gas	Varies	
								Xylenes	0.33	1.48	0.33	1.48	Gas	Varies	
Other HAP	0.02	0.08	0.02	0.08	Gas	Varies									
Total HAP	1.94	8.70	1.94	8.70	Gas	Varies									
CO2e	787	3,647	787	3,647	Gas	Varies									

ATTACHMENT K
Fugitive Emissions Data Summary Sheet

"27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as Attachment K."

- **Application Forms Checklist**
 - **Fugitive Emissions Summary**
 - **Leak Source Data Sheet**
-

Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS	
1.)	Will there be haul road activities? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If Yes, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.)	Will there be Storage Piles? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If Yes, then complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.)	Will there be Liquid Loading/Unloading Operations? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ((Truck Load-Out (TLO (6E)) is included in the Point Source Emissions)) <input type="checkbox"/> If Yes, then complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.)	Will there be emissions of air pollutants from Wastewater Treatment Evaporation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.)	Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes, then complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS DATA SHEET.
6.)	Will there be General Clean-up VOC Operations? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.)	Will there be any other activities that generate fugitive emissions? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form. If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions.

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants Chemical Name/CAS ¹	Maximum Potential Pre-Controlled Emissions ²		Maximum Potential Controlled Emissions ³		Est. Method Used ⁴
		lb/hr	ton/yr	lb/hr	ton/yr	
Paved Haul Roads	na	—	—	—	—	—
Unpaved Haul Roads	na	—	—	—	—	—
Storage Pile Emissions	na	—	—	—	—	—
Loading/Unloading Operations						
((Truck Load-Out (TLO (BE)) is included in the Point Source Emissions))						
Wastewater Treatment	na	—	—	—	—	—
Process and Piping Fugitives (FUG-G (1F) and FUG-W (2F) (Total Combined))	VOC	2.23	9.79	2.23	9.79	O - AP-42
	Benzene	0.03	0.12	0.03	0.12	O - AP-42
	E-Benzene	0.03	0.12	0.03	0.12	O - AP-42
	Formaldehyde	—	—	—	—	—
	n-Hexane	0.12	0.55	0.12	0.55	O - AP-42
	Toluene	0.03	0.12	0.03	0.12	O - AP-42
	2,2,4-TMP	0.03	0.12	0.03	0.12	O - AP-42
	Xylenes	0.03	0.12	0.03	0.12	O - AP-42
	Other HAP	—	—	—	—	—
	Total HAP	0.26	1.14	0.26	1.14	O - AP-42
	CO2e	108	475	108	475	O - GWP
General Clean-up VOC Emissions	na	—	—	—	—	—
Other	na	—	—	—	—	—

¹ List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases, etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases.
² Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in min (e.g. 5 lb VOC/20 min batch).
³ Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in min (e.g. 5 lb VOC/20 min batch).
⁴ Indicate method used to determine emission rate as follows:
 MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

Williams Ohio Valley Midstream LLC
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LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components ¹	Number of Components Monitored by Frequency ²	Average Time to Repair (Days) ³	Estimated Annual Emission Rate (lb/yr) ⁴
Pumps⁶	Light Liquid VOC ^{6,7}	4			See ATTACHMENT N EMISSION CALCULATIONS
	Heavy Liquid VOC ⁸				
	Non-VOC ⁸				
Valves¹⁰	Gas VOC	386			
	Light Liquid VOC	193			
	Heavy Liquid VOC				
Safety Relief Valves¹¹	Non-VOC				
	Gas VOC	See "Other"			
	Light Liquid VOC	See "Other"			
Open Ended Lines¹²	Non-VOC				
	Gas VOC	21			
	Light Liquid VOC	11			
Sampling Connections¹³	Non-VOC				
	Gas VOC	See "Open Ended Lines"			
	Light Liquid VOC	See "Open Ended Lines"			
Compressors	Non-VOC				
	Gas VOC	See "Other"			
Flanges	Non-VOC				
	Gas VOC	180			
	Light Liquid VOC	90			
Other (Connectors)	Non-VOC				
	Gas VOC	1,151			
	Light Liquid VOC	575			

na - LDAR Does NOT Apply

Continued ...

Attachment K
DESCRIPTION OF FUGITIVE EMISSIONS - Continued

Notes for Leak Source Data Sheet

1. For VOC sources include components on streams and equipment that contain greater than 10% VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.
2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in visual or soap-bubble leak detection ppm. Do not include monitoring by methods. "M/Q(M)/Q(SA/A/O)" means the time period between inspections as follows: Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/other (specify time period)
If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category valves, gas service: 0/50/0/75/0/50
3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.
4. Note the method used: MB - material balance; EE - engineering estimate; EPA - emission factors established by EPA (cite document used); 0 - other method, such as in-house emission factor (specify).
5. Do not include in the equipment count seal-less pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)
6. Volatile organic compounds (VOC) means the term as defined in 40 CFR. 51.100 (s).
7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20°C, then the fluid is defined as a light liquid.
8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20°C, then the fluid is defined as a heavy liquid.
9. LIST CO, H₂S, mineral acids, NO, NO, SO, etc. DO NOT LIST CO, H, H₂O, N, O, and Noble Gases.
10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.
11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.
12. Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.
13. Do not include closed-purge sampling connections.

ATTACHMENT L
Emissions Unit Data Sheet(s)

“28. Fill out the **Emissions Unit Data Sheet(s)** as Attachment L.”

- Natural Gas Compressor/Generator Engine Data Sheet
 - Caterpillar G3306TA Compressor Engine – Vendor Data
 - Natural Gas Glycol Dehydration Unit Data Sheet
 - 40 CFR Part 63; Subpart HH & HHH Registration Form
 - Storage Tank Data Sheet
 - Storage Tank List (Insignificant Sources)
 - Bulk Liquid Transfer Operations
-

Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
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NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET

Compressor Station		Taylor			
Source Identification Number ¹		CE-1			
Engine Manufacturer and Model		Caterpillar G3306TA			
Manufacturer's Rated bhp/rpm		203 / 1,800			
Source Status ²		ES			
Date Installed/Modified/Removed ³		2013			
Manufactured/Reconstruction Date ⁴		7/3/08			
Certified Engine (40CFR60 NSPS JJJJ) ⁵		No			
Engine, Fuel and Combustion Data	Engine Type ⁶	RB4S			
	APCD Type ⁷	na			
	Fuel Type ⁸	RG			
	H ₂ S (gr/100 scf)	0.2			
	Operating bhp/rpm	203 / 1,800			
	BSFC (Btu/bhp-hr)	8,998			
	Fuel (ft ³ /hr)	1,787			
	Fuel (MMft ³ /yr)	15.65			
	Operation (hrs/yr)	8,760			
Reference ⁹	PTE ¹⁰	lbs/hr	tons/yr	lbs/hr	tons/yr
MD	NOx	0.89	3.90		
MD	CO	1.78	7.80		
MD	VOC	0.28	1.22		
AP	SOx	1.1E-03	4.7E-03		
AP	PM10/2.5	0.04	0.16		
MD/AP	Benzene	2.9E-03	0.01		
MD/AP	Ethylbenzene	4.5E-05	2.0E-04		
MD	HCHO	0.11	0.49		
MD/AP	n-Hexane	---	---		
MD/AP	Toluene	1.0E-03	4.5E-03		
MD/AP	2,2,4-TMP	---	---		
MD/AP	Xylenes	3.6E-04	1.6E-03		
MD/AP	Other HAP	0.02	0.08		
MD/AP	Total HAP	0.13	0.58		
MD/AP	CO2	229	1,002		
MD/AP	CH4	0.46	2		
MD/40CFR98	N2O	4.03E-04	1.76E-03		
MD/40CFR98	CO2e	240	1,052		

Williams Ohio Valley Midstream LLC
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Attachment L

ATTACHMENT L - NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET - Continued

Notes to NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET

1. Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. If more than three (3) engines exist, please use additional sheets.

2. Enter the Source Status using the following codes:

- NS = Construction of New Source (installation)
- ES = Existing Source
- MS = Modification of Existing Source
- RS = Removal of Source

3. Enter the date (or anticipated date) of the engine's installation (construction of source), modification or removal.

4. Enter the date that the engine was manufactured, modified or reconstructed.

5. Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart JJJJ. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4243a(2)(i) through (iii), as appropriate.

Provide a manufacturer's data sheet for all engines being registered.

6. Enter the Engine Type designation(s) using the following codes:

- LB2S = Lean Burn Two Stroke
- RB4S = Rich Burn Four Stroke
- LB4S = Lean Burn Four Stroke

7. Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:

- A/F = Air/Fuel Ratio
- IR = Ignition Retard
- HEIS = High Energy Ignition System
- SIPC = Screw-in Precombustion Chambers
- PSC = Prestratified Charge
- LEC = Low Emission Combustion
- NSCR = Non-Selective Catalytic Reduction
- SCR = Lean Burn & Selective Catalytic Reduction

8. Enter the Fuel Type using the following codes:

- PQ = Pipeline Quality Natural Gas
- RG = Raw Natural Gas

9. Enter the Potential Emissions Data Reference designation using the following codes. Attach all referenced data to this Compressor/Generator Data Sheet(s).

- MD = Manufacturer's Data
- AP = AP-42
- GR = GRI-HAPCalcTM
- OT = Other (please list) _____

10. Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the Emissions Summary Sheet.



USA Compression Unit 2062 Caterpillar G3306TA Engine Emissions

Date of Manufacture	July 3, 2008	Engine Serial Number	G6X04853	Date Modified/Reconstructed	N/A
Driver Rated HP	203	Rated Speed in RPM	1800	Combustion Type	Spark Ignited 4 Stroke
Number of Cylinders	6	Compression Ratio	10.5:1	Combustion Setting	Rich Burn
Displacement, in ³	640	Fuel Delivery Method	Carburetor	Combustion Air Treatment	T.C/ Aftercooled

Raw Engine Emissions (905 LHV BTU/SCF Fuel Gas with little to no H2S)

Fuel Consumption 8098 LHV BTU/bhp-hr or 8908 HHV BTU/bhp-hr
Altitude 1500 ft
Maximum Air Inlet Temp 77 F

	<u>g/bhp-hr¹</u>	<u>lb/MMBTU²</u>	<u>lb/hr</u>	<u>TPY</u>
Nitrogen Oxides (NOx)	16.57		7.416	32.480
Carbon Monoxide (CO)	16.57		7.416	32.480
Volatile Organic Compounds (VOC or NMNEHC excluding CH2O)	0.37		0.166	0.725
Formaldehyde (CH2O)	0.25		0.112	0.490
Particulate Matter (PM) <small>Filterable+Condensable</small>		1.94E-02	0.035	0.154
Sulfur Dioxide (SO2)		5.88E-04	0.001	0.005
Carbon Dioxide (CO2)	<u>g/bhp-hr¹</u>	<u>lb/MMBTU²</u>	<u>lb/hr</u>	<u>Metric Tonne/yr</u>
Methane (CH4)	511	110.0	199	790
	1.02	0.23	0.416	1.652

¹ g/bhp-hr are based on Caterpillar Specifications. Note that g/bhp-hr values are based on 100% Load Operation.

It is recommended to add a safety margin to emissions to allow for operational flexibility and fuel gas composition variability.

² Emission Factor obtained from EPA's AP-42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources (Section 3.2 Natural Gas-Fired Reciprocating Engines, Table 3.2-3).

Catalytic Converter Emissions

Catalytic Converter Make and Model: *Maxim, EAC4-290-5*
Element Type: *3-Way*
Number of Elements in Housing: *1*
Air/Fuel Ratio Control *Compliance Controls, AFR-9*

	<u>% Reduction</u>		<u>lb/hr</u>	<u>TPY</u>
Nitrogen Oxides (NOx)	88	or 2 g/bhp-hr	0.89	3.90
Carbon Monoxide (CO)	76.0	or 4 g/bhp-hr	1.78	7.80
Volatile Organic Compounds (VOC or NMNEHC)	0	or 1 g/bhp-hr	0.17	0.73
Formaldehyde (CH2O)	0		0.11	0.49
Particulate Matter (PM)	0		3.51E-02	1.54E-01
Sulfur Dioxide (SO2)	0		1.06E-03	4.66E-03
Carbon Dioxide (CO2)	<u>% Reduction</u>		<u>lb/hr</u>	<u>Metric Tonne/yr</u>
Methane (CH4)	0		199	790
	0		0.42	1.65

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NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET

General Glycol Dehydration Unit Data		Compressor Station		Taylor CS			
		Manufacturer and Model		KW Int'l			
		Max Dry Gas Flow Rate (MMscfd)		7.0			
		Heat Input (MMBtu/hr) - HHV		0.22			
		Design Type (DEG or TEG)		TEG			
		Source Status ²		ES			
		Date Installed/Modified/Removed ³		2013			
		Regenerator Still Vent APCD ⁴		NA			
		Fuel HV (Btu/scf) - HHV		1,020			
		H ₂ S Content (gr/100 scf)		0.2			
		Operation (hrs/yr)		8,760			
		Source ID # ¹	Vent	Reference ⁵	PTE ⁶	lbs/hr	tons/yr
RSV-1 (2E)	Dehydrator 01 Still Vent + Flash Tank (Minimum of 50% "Recycle" of Flash Gas as Fuel in the Reboiler)	GRI-GLYCalc	VOC	12.40	54.29		
		GRI-GLYCalc	Benzene	0.21	0.91		
		GRI-GLYCalc	E-Benzene	0.09	0.41		
		GRI-GLYCalc	Formaldehyde	---	---		
		GRI-GLYCalc	n-Hexane	0.46	2.00		
		GRI-GLYCalc	Toluene	0.44	1.92		
		GRI-GLYCalc	2,2,4-TMP	1.7E-03	0.01		
		GRI-GLYCalc	Xylenes	0.30	1.32		
		GRI-GLYCalc	Other HAPs	---	---		
		GRI-GLYCalc	Total HAP	1.50	6.57		
		GRI-GLYCalc	CO ₂ e	342	1,498		
		RBV-01 (3E)	Dehydrator 01 Reboiler Vent	AP-42	NOX	0.02	0.10
AP-42	CO			0.02	0.08		
AP-42	VOC			1.2E-03	0.01		
AP-42	SO ₂			1.3E-04	5.7E-04		
AP-42	PM _{10/2.5}			1.7E-03	0.01		
AP-42	Benzene			4.6E-07	2.0E-06		
AP-42	E-Benzene			---	---		
AP-42	Formaldehyde			1.6E-05	7.1E-05		
AP-42	n-Hexane			3.9E-04	1.7E-03		
AP-42	Toluene			7.4E-07	3.2E-06		
AP-42	2,2,4-TMP			---	---		
AP-42	Xylenes			---	---		
AP-42	Other HAPs			4.1E-07	1.8E-06		
AP-42	Total HAP			4.1E-04	1.8E-03		
40CFR98	CO ₂ e	26	115				

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ATTACHMENT L - NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET - Continued

Notes to NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET

1. Enter the appropriate Source Identification Numbers for the glycol dehydration unit Reboiler Vent and glycol Regenerator Still Vent. The glycol dehydration unit Reboiler Vent and glycol Regenerator Still Vent should be designated RBV-1 and RSV-1, respectively. If the compressor station incorporates multiple glycol dehydration units, a Glycol Dehydration Unit Data Sheet shall be completed for each, using Source Identification #s RBV-2 and RSV-2, RBV-3 and RSV-3, etc.

2. Enter the Source Status using the following codes:

NS = Construction of New Source

ES = Existing Source

MS = Modification of Existing Source

RS = Removal of Source

3. Enter the date (or anticipated date) of the glycol dehydration unit's installation (construction of source), modification or removal.

4. Enter the Air Pollution Control Device (APCD) type designation using the following codes:

NA = None

CD = Condenser

FL = Flare

CC = Condenser/Combustion Combination

TO = Thermal Oxidizer

5. Enter the Potential Emissions Data Reference designation using the following codes:

MD = Manufacturer's Data

AP = AP-42

GR = GRI-GLYCalcTM

OT = Other (please list): _____

6. Enter the Reboiler Vent and glycol Regenerator Still Vent Potential to Emit (PTE) for the listed regulated pollutants in lbs per hour and tons per year. The glycol Regenerator Still Vent potential emissions may be determined using the most recent version of the thermodynamic software model GRI-GLYCalcTM (Radian International LLC & Gas Research Institute). Attach all referenced Potential Emissions Data (or calculations) and the GRI-GLYCalc Aggregate Calculations Report to this Glycol Dehydration Unit Data Sheet(s). This PTE data shall be incorporated in the Emissions Summary Sheet.

Include a copy of the GRI-GLYCalcTM analysis. This includes a printout of the aggregate calculations report, which shall include emissions reports, equipment reports, and stream reports.

***An explanation of input parameters and examples, when using GRI-GLYCalcTM is available on our website.**

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40 CFR Part 63; Subpart HH & HHH Registration Form - Continued

Please attach the following required dehydration unit information:

1. System map indicating the chain of custody information. See Page 43 of this document for an example of a gas flow schematic. It is not intended that the applicant provide this level of detail for all sources. The level of detail that is necessary is to establish where the custody transfer points are located. This can be accomplished by submitting a process flow diagram indicating custody transfer points and the natural gas flow. However, the DAQ reserves the right to request more detailed information in order to make the necessary decisions.
2. Extended gas analysis from the Wet Gas Stream, including mole percent of C1-C8, benzene, ethylbenzene, toluene, xylene and n-hexane, using Gas Processors Association (GPA) 2286 (or similar). A sample should be taken from the inlet gas line, downstream from any inlet separator, and using a manifold to remove entrained liquids from the sample and a probe to collect the sample from the center of the gas line. GPA standard 2166 reference method or a modified version of EPA Method TO-14, (or similar) should be used.
3. GRI-GLYCalc Ver. 3.0 aggregate report based on maximum Lean Glycol circulation rate and maximum throughput.
4. Detailed calculations of gas or hydrocarbon flow rate.

Section C: Facility NESHAPS Subpart HH/HHH status

Subject to Subpart HH -- However, *EXEMPT* because the facility is an area source of HAP emissions and the actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere is < 0.90 megagram per year (1.0 tpy); see 40CFR§63.764(e)(1)(ii).

Affected facility status:
 (choose only one)

Subject to Subpart HHH

Not Subject
 Because:

- < 10/25 TPY
- Affected facility exclusively handles black oil.
- Facility-wide actual annual average NG throughput is < 650 thousand scf/day and facility-wide actual annual average hydrocarbon liquid is < 250 bpd.
- No affected source is present.

Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<http://www.epa.gov/tnn/chief/>)

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Taylor Compressor Station	2. Tank Name 210 bbl Produced Water Tanks
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) T01 and T02 (identical)	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) 4E and 5E
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change <input checked="" type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): na	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. <p style="text-align: center;">210 barrels</p>	
9A. Tank Internal Diameter (ft) <p style="text-align: center;">10</p>	9B. Tank Internal Height (or Length) (ft) <p style="text-align: center;">15</p>
10A. Maximum Liquid Height (ft) <p style="text-align: center;">14</p>	10B. Average Liquid Height (ft) <p style="text-align: center;">8</p>
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. <p style="text-align: center;">210 barrels</p>	

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN - SLIDING COVER, GASKETED:	BUILT-UP COLUMN - SLIDING COVER, UNGASKETED:	PIPE COLUMN - FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN - SLIDING COVER, GASKETED:	PIPE COLUMN - SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks <input type="checkbox"/> Does Not Apply	
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: <input type="checkbox"/> Continuous sheet construction 5 feet wide <input type="checkbox"/> Continuous sheet construction 6 feet wide <input type="checkbox"/> Continuous sheet construction 7 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide <input type="checkbox"/> Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

IV. SITE INFORMATION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft ² ·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)
39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.	
39A. Material Name or Composition	
39B. CAS Number	
39C. Liquid Density (lb/gal)	
39D. Liquid Molecular Weight (lb/lb-mole)	
39E. Vapor Molecular Weight (lb/lb-mole)	

Maximum Vapor Pressure 39F. True (psia)			
39G. Reid (psia)			
Months Storage per Year 39H. From			
39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): Does Not Apply

- Carbon Adsorption¹
- Condenser¹
- Conservation Vent (psig)

Vacuum Setting	Pressure Setting
----------------	------------------
- Emergency Relief Valve (psig)
- Inert Gas Blanket of
- Insulation of Tank with
- Liquid Absorption (scrubber)¹
- Refrigeration of Tank
- Rupture Disc (psig)
- Vent to Incinerator¹
- Other¹ (describe):

¹ Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss		Annual Loss (lb/yr)	Estimation Method ¹
		Amount	Units		
VOC (each tank)				390	EPA-450/3-85-001a and ProMax

¹ EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

**Attachment L
EMISSIONS UNIT DATA SHEET
BULK LIQUID TRANSFER OPERATIONS**

Furnish the following information for each new or modified bulk liquid transfer area or loading rack, as shown on the *Equipment List Form* and other parts of this application. This form is to be used for bulk liquid transfer operations such as to and from drums, marine vessels, rail tank cars, and tank trucks.

Identification Number (as assigned on <i>Equipment List Form</i>): TLO				
1. Loading Area Name: Taylor Compressor Station				
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply): N/A				
<input type="checkbox"/> Drums	<input type="checkbox"/> Marine Vessels	<input type="checkbox"/> Rail Tank Cars	<input type="checkbox"/> Tank Trucks	
3. Loading Rack or Transfer Point Data:				
Number of pumps	1			
Number of liquids loaded	1			
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1			
4. Does ballasting of marine vessels occur at this loading area?				
<input type="checkbox"/> Yes		<input type="checkbox"/> No		<input checked="" type="checkbox"/> Does not apply
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: N/A				
6. Are cargo vessels pressure tested for leaks at this or any other location? N/A				
<input type="checkbox"/> Yes		<input type="checkbox"/> No		
If YES, describe:				
7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):				
Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	24	24	24	24
days/week	7	7	7	7
weeks/quarter	13	13	13	13

8. Bulk Liquid Data (add pages as necessary):

Pump ID No.	1				
Liquid Name	Prod. H2O				
Max. daily throughput (1000 gal/day)	0.58				
Max. annual throughput (1000 gal/yr)	211.68				
Loading Method ¹	SP				
Max. Fill Rate (gal/min)	200				
Average Fill Time (min/loading)	60				
Max. Bulk Liquid Temperature (°F)	60				
True Vapor Pressure ²	1.5				
Cargo Vessel Condition ³	U				
Control Equipment or Method ⁴	None				
Minimum control efficiency (%)	N/A				
Maximum Emission Rate (VOC)	Loading (lb/hr)	---			
	Annual (lb/yr)	960			
Estimation Method ⁵	EPA				

¹ BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

² At maximum bulk liquid temperature

³ B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

⁴ List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets*): CA = Carbon Adsorption LOA = Lean Oil Adsorption
 CO = Condensation SC = Scrubber (Absorption)
 CRA = Compressor-Refrigeration-Absorption TO = Thermal Oxidation or Incineration
 CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system)
 O = other (describe)

⁵ EPA = EPA Emission Factor as stated in AP-42
 MB = Material Balance
 TM = Test Measurement based upon test data submittal
 O = other (describe)

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

RECORDKEEPING

REPORTING

TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

ATTACHMENT M
Air Pollution Control Device Sheet(s)

"29. Fill out the **Air Pollution Control Device Sheet(s)** as Attachment M."

- NSCR on Caterpillar G3306TA Compressor Engine

Attachment M
Air Pollution Control Device Sheet
 (OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): 01-NSCR

Equipment Information

1. Manufacturer: Maxim (or equivalent) Model No. EAC4-290-5 (or equivalent)	2. Control Device Name: Catalytic Converter Type: Non-Selective Catalytic Reduction
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: NOx (≥88%) and CO (≥76)	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: _____ SCFM	10. Capacity: _____
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any.	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal.	

Gas Stream Characteristics

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Are particulates present?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Are metals present?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
15. Inlet Emission stream parameters:	Maximum	Typical	
Pressure (mmHg):			
Heat Content (BTU/scf):			
Oxygen Content (%):			
Moisture Content (%):			
Relative Humidity (%):			

16. Type of pollutant(s) controlled: <input type="checkbox"/> SO _x <input type="checkbox"/> Odor <input type="checkbox"/> Particulate (type): <input checked="" type="checkbox"/> Other NO _x and CO				
17. Inlet gas velocity: _____ ft/sec	18. Pollutant specific gravity:			
19. Gas flow into the collector: 970 ACFM @ 1,064°F and _____ PSIA	20. Gas stream temperature: Inlet: 1,064 °F Outlet: _____ °F			
21. Gas flow rate: Design Maximum: 970 ACFM Average Expected: 970 ACFM	22. Particulate Grain Loading in grains/scf: Inlet: Outlet:			
23. Emission rate of each pollutant (specify) into and out of collector:				
Pollutant	IN Pollutant	Emission Capture Efficiency %	OUT Pollutant	Control Efficiency %
	g/bhp-hr	grains/acf	g/bhp-hr	grains/acf
NO _x	16.57		2.0	88
CO	16.57		4.0	76
24. Dimensions of stack: _____ Height _____ ft. _____ Diameter _____ ft.				
25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.				

Particulate Distribution

26. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	Weight % for Size Range	Weight % for Size Range
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):	
28. Describe the collection material disposal system:	
29. Have you included <i>Other Collectores Control Device</i> in the Emissions Points Data Summary Sheet?	
30. Proposed Monitoring, Recordkeeping, Reporting, and Testing Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING:	RECORDKEEPING:
REPORTING:	TESTING:
MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device. RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring. REPORTING: Please describe any proposed emissions testing for this process equipment on air pollution control device. TESTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.	
31. Manufacturer's Guaranteed Control Efficiency for each air pollutant. NOx (≥88%) and CO (≥76%)	
32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.	
33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.	

ATTACHMENT N
Supporting Emissions Calculations

"30. Provide all **Supporting Emissions Calculations** as Attachment N."

- **Emission Summary Spreadsheets**
 - Potential to Emit (PTE) – CRITERIA POLLUTANTS – CONTROLLED
 - Potential to Emit (PTE) – HAZARDOUS AIR POLLUTANTS – CONTROLLED
 - Potential to Emit (PTE) – GREENHOUSE GASES (GHG) – CONTROLLED
 - Potential to Emit (PTE) – PRE-CONTROLLED
 - **Unit-Specific Emission Spreadsheets**
 - Compressor Engine – 203 bhp Caterpillar G3306TA (4SRB@1,800 rpm)
 - Triethylene Glycol (TEG) Dehydrator – 7.0 MMscfd
 - Triethylene Glycol (TEG) Reboiler – 0.22 MMBtu/hr
 - Storage Tanks – 2 X 210 bbl Produced Water
 - Truck Load-Out – 5,040 bbl/yr Produced Water
 - Startup/Shutdown/Maintenance (SSM)
 - Process Piping Fugitives – Gas & Water/Oil
 - **AP-42 and GHG Emission Factors**
 - **Model Results**
 - Dehydrator - GRI-GLYCalc 4.0
 - Summary of Emissions
 - Summary of Input Values
 - Aggregate Calculations Report
 - Storage Tank - ProMax
 - Flowchart
 - Workbook
-

POTENTIAL-TO-EMIT (PTE) – CRITERIA POLLUTANTS – CONTROLLED

Unit ID	Point ID	Control ID	Description	Site Rating	NOX lb/hr	tpy	CO lb/hr	tpy	VOC lb/hr	tpy	SO2 lb/hr	tpy	PM10/2.5 lb/hr	tpy
CE-1	1E	na	Compressor Engine - Caterpillar G3306TA	203 bhp	0.89	3.90	1.78	7.80	0.28	1.22	1.1E-03	4.7E-03	0.04	0.16
RSV-1	2E	na	TEG Dehydrator - Flash Tank & Still Vent	7.0 MMBscfd	—	—	—	—	12.40	54.29	—	—	—	—
RBV-1	3E	na	TEG Dehydrator - Reboiler	0.22 MMBtu/hr	0.02	0.10	0.02	0.08	1.2E-03	0.01	1.3E-04	5.7E-04	1.7E-03	0.01
T01	4E	na	Storage Tank - Produced Water	210 bbl	—	—	—	—	0.02	0.19	—	—	—	—
T02	5E	na	Storage Tank - Produced Water	210 bbl	—	—	—	—	0.02	0.19	—	—	—	—
TLO	6E	na	Truck Load-Out - Produced Water	5,040 bb/yr	—	—	—	—	—	0.52	—	—	—	—
SSM	7E	na	Startup/Shutdown/Maintenance	203 bhp	—	—	—	—	—	3.28	—	—	—	—
RPC	8E	na	Rod Packing/Crankcase Leaks	203 bhp	—	—	—	—	1.12	4.89	—	—	—	—
TOTAL POINT SOURCE EMISSIONS:					0.91	3.99	1.80	7.88	13.83	64.60	1.2E-03	0.01	0.04	0.16

**WV NSR THRESHOLD:
 TVOP THRESHOLD:**

6 lb/hr AND 10 tpy					
—	100	—	100	—	100

FUG-G	1F	na	Piping and Equipment Fugitives - Gas	1,737 units	—	—	—	—	1.36	5.85	—	—	—	—
FUG-W	2F	na	Piping and Equipment Fugitives - Water/Oil	873 units	—	—	—	—	0.88	3.84	—	—	—	—
TOTAL FUGITIVE EMISSIONS:					—	—	—	—	2.23	9.79	—	—	—	—

TOTAL FACILITY-WIDE EMISSIONS:

0.91	3.99	1.80	7.88	16.07	74.39	1.2E-03	5.3E-03	0.04	0.16
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- Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hr/yr.
 2 - VOC is volatile organic compounds, as defined by EPA, and includes HCHO (formaldehyde).
 3 - PM10/2.5 is filterable and condensable particulate matter, including PM10 and PM2.5.
 4 - HCHO is Formaldehyde; Other HAP includes Acetaldehyde, Acrolein, 1,3-Butadiene, Methanol, Methylene Chloride, and traces of other HAP.

POTENTIAL-TO-EMIT (PTE) – HAZARDOUS AIR POLLUTANTS (HAP) – CONTROLLED

Unit ID	Point ID	Benzene		Ethylbenzene		Formaldehyde		n-Hexane		Toluene		2,2,4-TMP		Xylenes		Other HAP		Total HAP	
		CAS: 71-43-2 MW: 78.11 lb/lb-mol	lb/hr tpy	CAS: 121-69-16 MW: 106.17 lb/lb-mol	lb/hr tpy	CAS: 121-69-26 MW: 30.03 lb/lb-mol	lb/hr tpy	CAS: 121-69-34 MW: 86.18 lb/lb-mol	lb/hr tpy	CAS: 121-69-87 MW: 92.14 lb/lb-mol	lb/hr tpy	CAS: 121-69-94 MW: 114.23 lb/lb-mol	lb/hr tpy	CAS: 121-69-99 MW: 106.17 lb/lb-mol	lb/hr tpy				
CE-1	1E	2.9E-03	0.01	4.5E-05	2.0E-04	0.11	0.49	---	---	1.0E-03	4.5E-03	---	---	3.6E-04	1.6E-03	0.02	0.08	0.13	0.58
RSV-1	2E	0.21	0.91	0.09	0.41	---	---	0.46	2.00	0.44	1.92	1.7E-03	0.01	0.30	1.32	---	---	1.50	6.57
RBV-1	3E	4.6E-07	2.0E-06	---	---	1.6E-05	7.1E-05	3.9E-04	1.7E-03	7.4E-07	3.2E-06	---	---	---	---	---	---	---	---
T01	4E	6.1E-04	3.2E-03	6.1E-04	3.2E-03	---	---	2.0E-03	1.2E-02	6.1E-04	3.2E-03	6.1E-04	3.2E-03	6.1E-04	3.2E-03	4.1E-07	1.8E-06	4.1E-04	1.8E-03
T02	5E	6.1E-04	3.2E-03	6.1E-04	3.2E-03	---	---	2.0E-03	1.2E-02	6.1E-04	3.2E-03	6.1E-04	3.2E-03	6.1E-04	3.2E-03	---	---	0.01	0.02
TLO	6E	---	0.02	---	0.02	---	---	---	0.05	---	0.02	---	0.02	---	---	---	---	---	0.01
SSM	7E	---	1.2E-03	---	1.2E-03	---	---	---	0.08	---	1.2E-03	---	1.2E-03	---	---	---	---	---	0.13
RPC	8E	5.0E-03	0.02	5.0E-03	0.02	2.7E-03	0.01	5.0E-03	0.02	5.0E-03	0.02	5.0E-03	0.02	5.0E-03	0.02	---	---	0.03	0.14
TOTAL POINT:		0.22	0.97	0.10	0.45	0.11	0.60	0.47	2.18	0.45	1.97	0.01	0.05	0.31	1.36	0.02	0.08	1.68	7.57
FUG-G	1F	5.6E-04	2.4E-03	5.6E-04	2.4E-03	---	---	0.04	0.16	5.6E-04	2.4E-03	5.6E-04	2.4E-03	5.6E-04	2.4E-03	---	---	0.04	0.18
FUG-W	2F	0.03	0.12	0.03	0.12	---	---	0.08	0.38	0.03	0.12	0.03	0.12	0.03	0.12	---	---	0.22	0.96
TOTAL FUG:		0.03	0.12	0.03	0.12	---	---	0.12	0.55	0.03	0.12	0.03	0.12	0.03	0.12	---	---	0.26	1.14
TOTAL FACILITY:		0.24	1.09	0.13	0.57	0.11	0.60	0.59	2.73	0.47	2.09	0.03	0.17	0.33	1.48	0.02	0.08	1.94	8.70
NSR THRESHOLD:		2 lb/hr	OR 0.5 tpy	2 lb/hr	OR 5 tpy	2 lb/hr	OR 0.5 tpy	2 lb/hr	OR 5 tpy	2 lb/hr	OR 5 tpy	2 lb/hr	OR 5 tpy	2 lb/hr	OR 5 tpy	2 lb/hr	OR 5 tpy	2 lb/hr	OR 5 tpy
YOP THRESHOLD:		---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	25

- Notes:
- 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr.
 - 2 - VOC is volatile organic compounds, as defined by EPA, and includes HCHO (formaldehyde).
 - 3 - PM10/2.5 is filterable and condensable particulate matter, including PM10 and PM2.5.
 - 4 - HCHO is formaldehyde; Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), 2,2,4-TMP (i-octane), acetaldehyde, acrolein, and methanol.

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Attachment N - Supporting Emissions Calculations

Potential to Emit (PTE) - GREENHOUSE GASES (GHG) - CONTROLLED

Unit ID	Point ID	Control ID	Description	Heat Input MMBtu/hr (HHV)	Hours of Operation hr/yr	kg/MMBtu:		kg/MMBtu:		kg/MMBtu:		1.00E-04 GWP: 298 CO2e tpy	TOTAL CO2e tpy
						CO2 tpy	CH4 tpy	GWP: 25 CO2e tpy	N2O tpy	1.00E-03 GWP: 298 CO2e tpy			
CE-1	1E	na	Compressor Engine - Caterpillar G3306TA	1.83	8,760	1,002	2	1,002	1.8E-03	50	1,052	1,052	
RSV-1	2E	na	TEG Dehydrator - Flash Tank & Still Vent	---	8,760	---	60	1,498	---	---	1,498	1,498	
RBV-1	3E	na	TEG Dehydrator - Reboiler	0.22	8,760	114	2.2E-03	0.1	2.1E-03	1	115	115	
T01	4E	na	Storage Tank - Produced Water	---	8,760	2.2E-03	0.3	6.8	---	---	7	7	
T02	5E	na	Storage Tank - Produced Water	---	8,760	2.2E-03	0.3	6.8	---	---	7	7	
TLO	6E	na	Truck Load-Out - Produced Water	---	---	---	---	---	---	---	---	---	
SSM	7E	na	Startup/Shutdown/Maintenance	---	---	0.04	8	188.7	---	---	189	189	
RPC	8E	na	Rod Packing/Crankcase Leaks	---	8,760	24	11	281	---	---	305	305	
TOTAL POINT SOURCE EMISSIONS:						1,140	81	2,031	3.9E-03	1	3,172	3,172	

NSR/PSD Threshold: (na - OR - na) - AND - na
 Title V Major Source Threshold: (na - OR - na) - AND - na

Unit ID	Description	Hours of Operation hr/yr	kg/MMBtu: CO2 tpy	kg/MMBtu: CH4 tpy	kg/MMBtu: GWP: 25 CO2e tpy	kg/MMBtu: N2O tpy	1.00E-04 GWP: 298 CO2e tpy	TOTAL CO2e tpy
FUG-G 1F	Piping and Equipment Fugitives - Gas	8,760	0.1	18	446	---	---	446
FUG-W 2F	Piping and Equipment Fugitives - Water/Oil	8,760	0.04	1.15	29	---	---	29
TOTAL FUGITIVE EMISSIONS:						19	475	475

TOTAL FACILITY-WIDE PTE: 1,140 100 3.9E-03 3,647

- Notes:
- 1 - Emissions are based on operation at 100% of rated load.
 - 2 - Engine CO2 and CH4 emissions are based on vendor specifications.
 - 3 - Fugitive CH4 emissions are based on EPA Fugitive Emission Factors for Oil and Gas Production Operations.
 - 4 - All other GHG emissions are based on default values in 40CFR98, Subpart C, Table C-1.
 - 5 - High Heat Value (HHV) = Low Heat Value (LHV) / 0.90.
 - 6 - GHG NSR/PSD Thresholds and Title V Major Source Thresholds are applicable only if other regulated air pollutants exceed the corresponding Thresholds.

Attachment N - Supporting Emissions Calculations

POTENTIAL-TO-EMIT (PTE) – PRE-CONTROLLED

Unit ID	Point ID	Control ID	Description	Site Rating	NOX lb/hr	tpy	CO lb/hr	tpy	VOC lb/hr	tpy	n-HEXANE lb/hr	tpy	TOTAL HAP lb/hr	tpy
CE-1	1E	na	Compressor Engine - Caterpillar G3306TA	203 bhp	0.89	3.90	1.78	7.80	0.28	1.22	—	—	0.13	0.58
RSV-1	2E	na	TEG Dehydrator - Flash Tank & Still Vent	7.0 MMscfd	—	—	—	—	12.40	54.28	0.46	2.00	1.50	6.57
RBV-1	3E	na	TEG Dehydrator - Reboiler	0.22 MMbtu/hr	0.02	0.10	0.02	0.08	1.2E-03	0.01	3.9E-04	1.7E-03	4.1E-04	1.8E-03
T01	4E	na	Storage Tank - Produced Water	210 bbl	—	—	—	—	0.02	0.18	2.0E-03	1.2E-02	0.01	0.02
T02	5E	na	Storage Tank - Produced Water	210 bbl	—	—	—	—	0.02	0.19	2.0E-03	1.2E-02	0.01	0.02
TLO	6E	na	Truck Load-Out - Produced Water	5,040 bbl/yr	—	—	—	—	—	0.52	—	0.05	—	0.13
SSM	7E	na	Startup/Shutdown/Maintenance	203 bhp	—	—	—	—	1.12	4.89	5.0E-03	0.02	—	0.09
RPC	8E	na	Rod Packing/Crankcase Leaks	203 bhp	0.91	3.99	1.80	7.88	13.83	64.60	0.47	2.18	1.68	7.57
TOTAL POINT SOURCE EMISSIONS:														
					6 lb/hr AND	10 tpy	6 lb/hr AND	10 tpy	6 lb/hr AND	10 tpy	6 lb/hr AND	10 tpy	6 lb/hr AND	10 tpy
					—	100	—	100	—	100	—	100	—	100

WV NSR THRESHOLD:

TVOP THRESHOLD:

FUG-G	1F	na	Piping and Equipment Fugitives - Gas	1,737 units	—	—	—	—	1.36	5.95	0.04	0.16	0.04	0.18
FUG-W	2F	na	Piping and Equipment Fugitives - Water/Oil	873 units	—	—	—	—	0.88	3.84	0.09	0.38	0.22	0.98
TOTAL FUGITIVE EMISSIONS:														
					0.91	3.99	1.80	7.88	16.07	74.39	0.59	2.73	1.94	8.70
TOTAL FACILITY-WIDE EMISSIONS:														

Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hr/yr.

2 - VOC is volatile organic compounds, as defined by EPA, and includes HCHO (formaldehyde).

3 - PM10/2.5 is filterable and condensable particulate matter, including PM10 and PM2.5.

4 - HCHO is Formaldehyde; Other HAP includes Acetaldehyde, Acrolein, 1,3-Butadiene, Methanol, Methylene Chloride, and traces of other HAP.

TAYLOR COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

Compressor Engine - Caterpillar G3306TA

Unit ID (Point ID)	Description	Reference	Pollutant	Pre-Controlled Emissions g/bhp-hr	Pre-Controlled Emissions lb/hr	tpy	Control Efficiency	g/bhp-hr	Controlled Emissions lb/hr	tpy
CE-1 (1E)	Caterpillar G3306TA 4SRB 203 bhp (site rated) 1,800 rpm Commenced Construction After 07/01/08 NSPS JJJJ - YES NESHAP ZZZZ - YES 8,760 hr/yr 8,098 Btu/bhp-hr (LHV) 8,998 Btu/bhp-hr (HHV) 1.64 MMBtu/hr (LHV) 1.83 MMBtu/hr (HHV) 14,401 MMBtu/yr (LHV) 1,787 scf/hr 15.65 MMscf/yr 920 Btu/scf (LHV) 1,020 Btu/scf (HHV)	Vendor Specs	NOx	16.57	7.42	32.48	88.0%	1.99	0.89	3.90
		Vendor Specs	CO	16.57	7.42	32.48	76.0%	3.98	1.78	7.80
		NMHC+CH4	THC	2.22	0.99	4.35	0.0%	2.22	0.99	4.35
		Vendor Specs	NMHC	1.20	0.54	2.35	0.0%	1.20	0.54	2.35
		Vendor Specs	NMNEHC	0.37	0.17	0.73	0.0%	0.37	0.17	0.73
		NMNEHC+HCHO	VOC	0.62	0.28	1.22	0.0%	0.62	0.28	1.22
		AP-42 Table 3.2-2	SO2	2.4E-03	1.1E-03	4.7E-03	0.0%	2.4E-03	1.1E-03	4.7E-03
		AP-42 Table 3.2-2	PM10/2.5	0.08	0.04	0.16	0.0%	0.08	0.04	0.16
		AP-42 Table 3.2-2	Benzene	0.01	0.00	0.01	0.0%	0.01	0.00	0.01
		AP-42 Table 3.2-2	Ethylbenzene	1.0E-04	4.5E-05	2.0E-04	0.0%	1.0E-04	4.5E-05	2.0E-04
		Vendor Specs	HCHO	0.25	0.11	0.49	0.0%	0.25	0.11	0.49
		AP-42 Table 3.2-2	n-Hexane	—	—	—	0.0%	—	—	—
		AP-42 Table 3.2-2	Toluene	2.3E-03	1.0E-03	4.5E-03	0.0%	2.3E-03	1.0E-03	4.5E-03
		AP-42 Table 3.2-2	2,2,4-TMP	—	—	—	0.0%	—	—	—
		AP-42 Table 3.2-2	Xylenes	8.0E-04	3.6E-04	1.6E-03	0.0%	8.0E-04	3.6E-04	1.6E-03
		AP-42 Table 3.2-2	Other HAP	0.04	0.02	0.08	0.0%	0.04	0.02	0.08
		Sum	Total HAP	0.30	0.13	0.58	0.0%	0.30	0.13	0.58
		Vendor Specs	CO2	511	229	1,002	0.0%	511	229	1,002
		Vendor Specs	CH4	1	0	2	0.0%	1	0	2
		AP-42 Table 3.2-3	N2O	9.0E-04	4.0E-04	1.8E-03	0.0%	9.0E-04	4.0E-04	1.8E-03
40CFR98 - Table A-1	CO2e	537	240	1,052	0.0%	537	240	1,052		

- Notes:
- 1 - The emissions are based on operation at 100% of rated load for 8,760 hr/yr.
 - 2 - As per Engine Specifications, emission values are based on adjustment to specified NOx level, all other emission values are "Not to Exceed" (i.e., Vendor Guarantee).
 - 3 - As per Engine Specifications, NMNEHC (non-methane/non-ethane hydrocarbon) does not include HCHO. VOC is the sum of NMNEHC and HCHO.
 - 4 - PM10/2.5 is Filterable and Condensable Particulate Matter, including PM10 and PM2.5
 - 5 - HCHO is Formaldehyde; Other HAP includes Acetaldehyde, Acrolein, 1,3-Butadiene, Methanol, Methylene Chloride, and traces of other HAP.
 - 6 - The control efficiency (CE) for each HAP is assumed to be the same as the CE for NMHC, except for HCHO where the vendor provides specific data.
 - 7 - The fuel heating value will vary, 920 Btu/scf (LHV) is at the low end of the range and results in a high (conservative) fuel consumption estimate.
 - 8 - Only the calculations based on Vendor Guarantees should be used to establish emission limitations.

TAYLOR COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

TEG Dehydrator - Flash Tank & Still Vent

Unit ID (Point ID)	Description	Reference	Pollutant	Emission Factor lb/MMscf	Emission Factor lb/MMBtu	Pre-Control Emissions lb/hr	Controlled Emissions tpy	Control %	Controlled Emissions lb/hr	Controlled Emissions tpy
RSV-1 (2E)	Dehydrator 01 (Flash Tank + Still Vent) (No Combustion Emissions Shown) (See RBV-1 (3E)) 7.0 MMscfd 8,760 hr/yr 0.28 MMscf/hr 2,555 MMscf/yr NESHAP HH - Exempt	See BLR-01	NOX	---	---	---	---	---	---	---
		See BLR-01	CO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	THC	---	---	33.91	148.50	---	33.91	148.50
		GRI-GLYCalc 4.0	NMHC	---	---	20.22	88.57	---	20.22	88.57
		GRI-GLYCalc 4.0	NMNEHC	---	---	12.40	54.29	---	12.40	54.29
		GRI-GLYCalc 4.0	VOC	---	---	12.40	54.29	---	12.40	54.29
		See BLR-01	SO2	---	---	---	---	---	---	---
		See BLR-01	PM10/2.5	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Benzene	---	---	0.21	0.91	---	0.21	0.91
		GRI-GLYCalc 4.0	Ethylbenzene	---	---	0.09	0.41	---	0.09	0.41
		See BLR-01	HCHO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	n-Hexane	---	---	0.46	2.00	---	0.46	2.00
		GRI-GLYCalc 4.0	Toluene	---	---	0.44	1.92	---	0.44	1.92
GRI-GLYCalc 4.0	2,2,4-TMP	---	---	0.00	0.01	---	0.00	0.01		
GRI-GLYCalc 4.0	Xylenes	---	---	0.30	1.32	---	0.30	1.32		
GRI-GLYCalc 4.0	Other HAP	---	---	---	---	---	---	---		
GRI-GLYCalc 4.0	Total HAP	---	---	1.50	6.57	---	1.50	6.57		
See BLR-01	CO2	---	---	---	---	---	---	---	---	
GRI-GLYCalc 4.0	CH4	---	---	14	60	---	14	60		
See BLR-01	N2O	---	---	---	---	---	---	---	---	
40CFR98 - Table A-1	CO2e	---	---	---	---	342	1,498	---	342	1,498

Notes: 1 - To be conservative, and to account for potential future changes in gas quality, the following worst-case emissions were assumed:

7.0 MMscfd Dehydrator 01	GRI-GLYCalc 4.0* (Flash Tank + Still Vent)	Worst-Case (With 20% Margin)	*Dehydrator Operating Parameters (See Attachment N)
THC	123.75 tpy	148.50 tpy	Flow Rate: 7.0 MMscfd Flash Tank Temperature: 70 oF
NMHC	73.81 tpy	88.57 tpy	Gas Analysis: Attachment H Flash Tank Pressure: 150 psig
NMNEHC = VOC	45.24 tpy	54.29 tpy	Flash Tank Control: na - 50% Recycle
Benzene	0.76 tpy	0.91 tpy	Wet Gas Temperature: 75 oF
Ethylbenzene	0.34 tpy	0.41 tpy	Wet Gas Pressure: 1,000 psig Stripping Gas: na
HCHO	---	---	Wet Gas Water Content: Saturated Stripping Gas Flow Rate: na
n-Hexane	1.67 tpy	2.00 tpy	Dry Gas Water Content: 7.0 lb H2O/MMscf Condenser Temperature: na
Toluene	1.60 tpy	1.92 tpy	Lean Glycol Water Content: 1.5 wt% H2O Condenser Pressure: na
2,2,4-TMP (i-Octane)	0.01 tpy	0.01 tpy	Glycol Circulation Rate: 1.50 gpm Combustor Temperature: na
Xylenes	1.10 tpy	1.32 tpy	Glycol Pump: Gas Injection Combustor Excess O2: na
Other HAP	---	---	Glycol Pump: Kimray 9015PV Combustor Efficiency: 70
Total HAP	5.48 tpy	6.57 tpy	
CH4	50 tpy	60 tpy	

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Attachment N - Supporting Emissions Calculations

TEG Dehydrator - Reboiler

Unit ID (Point ID)	Description	Reference	Pollutant	Emission Factor		Pre-Controlled Emissions	Control Efficiency	Controlled Emissions
				lb/MMscf	lb/MMBtu	lb/hr	%	lb/hr
RBV-1 (3E)	TRIETHYLENE GLYCOL (TEG) REBOILER	EPA AP-42 Table 1.4-1	NOX	100.00	0.10	0.02	---	0.02
		EPA AP-42 Table 1.4-1	CO	84.00	0.08	0.02	---	0.02
		EPA AP-42 Table 1.4-2	THC	11.00	0.01	2.4E-03	---	2.4E-03
		EPA AP-42 Table 1.4-2	NMHC	8.70	0.01	1.9E-03	---	1.9E-03
		EPA AP-42 Table 1.4-2	NMNEHC	5.60	0.01	1.2E-03	---	1.2E-03
		EPA AP-42 Table 1.4-2	VOC	5.68	0.01	1.2E-03	---	1.2E-03
		EPA AP-42 Table 1.4-2	SO2	0.60	5.9E-04	1.3E-04	---	1.3E-04
		EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	1.7E-03	---	1.7E-03
		EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.1E-06	4.6E-07	---	4.6E-07
		EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---
		EPA AP-42 Table 1.4-3	HCHO	0.08	7.4E-05	1.6E-05	---	1.6E-05
		EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.8E-03	3.9E-04	---	3.9E-04
		EPA AP-42 Table 1.4-3	Toluene	3.4E-03	3.3E-06	7.4E-07	---	7.4E-07
		EPA AP-42 Table 1.4-3	2,2,4-TMP	---	---	---	---	---
EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---		
EPA AP-42 Table 1.4-3	Other HAP	1.9E-03	1.9E-06	4.1E-07	---	4.1E-07		
	SUM	1.88	1.8E-03	4.1E-04	---	4.1E-04		
	EPA AP-42 Table 1.4-3	CO2	120,000	118	26	---	26	
	EPA AP-42 Table 1.4-3	CH4	2.30	2.3E-03	5.0E-04	---	5.0E-04	
	EPA AP-42 Table 1.4-3	N2O	2.20	2.2E-03	4.8E-04	---	4.8E-04	
	40CFR98 - Table A-1	CO2e	120,713	118	26	---	26	

- Notes:
- 1 - The fuel heating value will vary, 920 Btu/scf (LHV) is at the low end of the range and results in a high (conservative) fuel consumption estimate.
 - 2 - PM10/2.5 is filterable and condensable particulate matter, including PM10 and PM2.5.
 - 3 - HCHO is Formaldehyde; Other HAP includes Acetaldehyde, Acrolein, 1,3-Butadiene, Methanol, Methylene Chloride, and traces of other HAP.
 - 4 - Emission factors in AP-42 are NOT EPA-recommended emission limits. Because emission factors essentially represent an average of a range of emission rates, a permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance.

Attachment N - Supporting Emissions Calculations

Storage Tank - Produced Water

Unit ID (Point ID)	Material Stored	Capacity bbl	Turn-overs /yr	T-Put bbl/yr	EPA-450/ (Working and Breathing Losses)	ProMax (Flashing Losses)	VOC 100.00 lb/MMcf lb/hr tpy	n-Hexane 10.00 Wgt% lb/hr tpy	BTEX, TMP-ea 3.00 Wgt% lb/hr tpy	Total HAP 25.00 Wgt% lb/hr tpy	CO2 1.00 Wgt% lb/hr tpy	CH4 30.00 Wgt% lb/hr tpy	CO2e GWP = 25 lb/hr tpy
T01 (4E)	Prod H2O	210	12.0	2,520	0.039 lb/bbl	0.031 lb/bbl	0.02	2.0E-03	6.1E-04	0.01	2.0E-04	0.01	0.15
T02 (5E)	Prod H2O	210	12.0	2,520	0.039 lb/bbl	0.031 lb/bbl	0.02	2.0E-03	6.1E-04	0.01	2.0E-04	0.01	0.15
TOTAL VOLUME:		420	12.0	5,040									

Unit ID (Point ID)	Material Stored	Capacity bbl	Turn-overs /yr	T-Put bbl/yr	Tank Volume	Blanket Gas Volume	VOC 16,100 lb/MMcf lb/hr tpy	n-Hexane 400 lb/MMcf lb/hr tpy	BTEX, TMP-ea 86 lb/MMcf lb/hr tpy	Total HAP 430 lb/MMcf lb/hr tpy	CO2 200 lb/MMcf lb/hr tpy	CH4 37,000 lb/MMcf lb/hr tpy	CO2e GWP = 25 lb/hr tpy
T01 (4E)	Prod H2O	210	12.0	2,520	1,100 scf	13,195 scf	0.11	2.8E-03	5.7E-04	2.8E-03	1.3E-03	0.24	8
T02 (5E)	Prod H2O	210	12.0	2,520	1,100 scf	13,195 scf	0.11	2.8E-03	5.7E-04	2.8E-03	1.3E-03	0.24	8
TOTAL VOLUME:		420	12.0	5,040									

TOTAL EMISSIONS: 0.04 0.39 4.0E-03 0.02 1.2E-03 0.01 0.01 0.05 4.0E-04 0.00 0.01 0.54 0.30 14

Notes:

- 1 - EPA-450/3-85-001a - "Volatile Organic Compound Emissions from Petroleum Refinery Wastewater Systems - Background Information for Proposed Standards" is a reasonable protocol for estimating potential water/soil storage tank working and breathing losses. EPA-450/3-85-001a, page 3-39, gives a VOC emission factor of 420 kg/MMgal wastewater produced in an oil-water separator. (0.420 g/gal * 0.0022 lb/g * 42 gal/bbl = 0.3888 lb/bbl)
- 2 - These emission estimates are nearly 4X more conservative than emission factors required by the TCEQ on the Barnett Shale produced water tanks at gas-only sites.

Table 1. Produced Water Storage Tank Flash Loss Emissions Factors for Barnett Shale Special Inventory Purposes ONLY

Pollutant	Average Produced Water Emission Factor (lb/bbl)	
	Gas Production Only Sites	Liquid Hydrocarbon and Gas Production Sites
VOC	0.01	0.0402
Benzene	0.0003	0.000054
Toluene	0.0003	0.000130
Ethylbenzene	0.00006	0.000003
Xylenes	0.00006	0.000049
n-Hexane	NA	0.000987

- 3 - Total HAP is estimated at 25.0% of VOC emissions. This is a very conservative estimate based on an investigation of other produced water emission estimating protocols, as exemplified above (e.g., (0.0001+0.0003+0.00006+0.00006)*100 = 4.7%).
- 4 - The ProMax Simulation software was used to estimate flashing losses from the produced water storage tank.
- 5 - A natural gas blanket may be used on the produced water tank to prevent air from entering the tank and causing an explosion. Field natural gas would be used as the blanket gas. An option to use blanket gas on the produced water tank is requested.

TAYLOR COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

Truck Load-Out - Produced Water

Unit ID (Point ID)	Description	S sat. fac.	P psia	MW lb/lb-mol	T °R	CE %	L _L lb/Mgal	T-Put Mgal/yr	VOC AP-42 Sect 6.2 lb/hr	n-Hexane 10.00% of VOC lb/hr	BTEX, TMP (ea) 3.00% of VOC lb/hr	Total HAP 26.0% of VOC lb/hr
TLO (6E)	Produced Water	1.45	1.5	82	510	—	4.90	212	14.60	1.46	0.44	3.65
TOTAL TLO EMISSIONS:									14.60	1.46	0.44	3.65

Notes: 1 - Emission factors and formulas are from AP-42 Section 5.2 "Transportation and Marketing of Petroleum Liquids":

$$L_L = 12.46 \times S \times P \times MW / T \times (1 - CE)$$

where:

L_L = Loading loss, lb/1000 gal of liquid loaded.

S = Saturation factor, use 1.45 for "splash loading".

P = True vapor pressure of liquid loaded, psia. Estimated at 1.5 psia.

MW = molecular weight of vapors, lb/lb-mol. (Assumed MW of toluene as it has similar RVP and density as anticipated liquids.)

T = Temperature of bulk liquid loaded, °R = °F + 460. (Conservatively assumed 50 °F.)

CE = Overall emission reduction efficiency (collection efficiency x control efficiency).

5 - Assume 50 gpm load-out results in: 71 hr/yr.

6 - Emission factors in AP-42 are NOT EPA-recommended emission limits. Because emission factors essentially represent an average of a range of emission rates, a permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance.

TAYLOR COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

Startup/Shutdown/Maintenance

Unit ID (Point ID)	Description	No of Compressor Units	Total bhp	SSM and Blowdown		a. Engine "Cold-Start" Gas Volume scf/SSM	b. Blowdown Gas Volume scf/SSM	Total Gas Vented MMscf/yr	VOC lb/MMscf	n-Hexane lb/MMscf	BTEX, TMP (ea) lb/MMscf	Total HAP lb/MMscf	CO2 lb/MMscf	CH4 lb/MMscf	CO2e GWP = 25 tpy			
				Events/yr	Events/yr													
SSM (7E)	a. Cold Start (Engine)	1	203	208	700	0.15	1.17	16,100	400	6	430	200	37,000	67				
	b. Blowdown (Recip Comp)			208		0.26	2.11				0.03	0.01	3	67				
TOTAL FACILITY-WIDE SSM EMISSIONS:												3.28	0.08	1.2E-03	0.09	0.04	8	189

- Notes:**
- 1 - SSM Emissions are the sum of:
 - a. Unburned fuel resulting from "cold-start" of idle gas-fired engines; and
 - b. Natural gas that is purged (aka blowdown) from the compressors and associated piping and equipment.
 - 2 - CM-01 and CM-02 thru CM-07 are gas compressors driven by electric motors. CM-01 is the Columbia compressor, CM-02 thru CM-07 are the residue gas compressors.
 - 3 - Starting Gas Quantity and Blowdown (B-D) Gas Quantity as per Engineering Department.
 - (e.g., 8,577 scf/B-D of a compressor with a 1,380 bhp engine equals 6.22 scf/bhp/B-D.)

Engines	a. Unburned "Cold-Start" Gas is Constant at:	700 scf/start
	b. Blowdown Gas is Related to bhp at:	6.22 scf/bhp/B-D

4 - To be conservative, the following gas characteristics were assumed:

Pollutant	Inlet Gas Analysis	Estimated
Carbon Dioxide	154 lb/MMscf	200 lb/MMscf
Methane	30,455 lb/MMscf	37,000 lb/MMscf
VOC (Propane)	14,087 lb/MMscf	16,100 lb/MMscf
n-Hexane	330 lb/MMscf	400 lb/MMscf
BTEX, TMP (ea)	4 lb/MMscf	6 lb/MMscf
Total HAP:	348 lb/MMscf	430 lb/MMscf

5 - Emission estimates are conservatively based on:

Starts-Stops per week per Engine.	4.0
Blowdown(e) per week per Compressor	4.0

Attachment N - Supporting Emissions Calculations

Rod Packing/Crankcase Leaks

Unit ID (Point ID)	Unit Description	No. of Recip Compressors	Cyl per Recip Compressor	scfh per Cyl	Contingency	Total Leak Rate MMscf/yr	VOC lb/MMscf	HCHO lb/MMscf	n-Hex,BTEX (Ea) lb/MMscf	Total HAP lb/MMscf	CO2 lb/MMscf	CH4 lb/MMscf	CO2e lb/MMscf
RPC (8E)	Rod Packing - CE-1	1	4	15	15%	0.60	16,100	na	72	430	200	37,000	925,200
							lb/hr	tpy	tpy	tpy	tpy	tpy	tpy
							1.11	4.87	4.9E-03	0.03	0.01	3	64
													280

Unit ID (Point ID)	Unit Description	Total Recip Horsepower (bhp)	Leak Rate scf/bhp-hr	Safety Factor	VOC lb/MMscf	HCHO lb/MMscf	n-Hex,BTEX (Ea) lb/MMscf	Total HAP lb/MMscf	CO2 lb/MMscf	CH4 lb/MMscf	CO2e lb/MMscf
RPC (8E)	Crankcase Emissions	384	1.68	250%	13.76	5.56	0.18	6.62	11,342	23	11,908
					lb/hr	tpy	tpy	tpy	tpy	tpy	tpy
					0.01	2.7E-03	8.5E-05	0.00	5.4	0.01	5.7
											25

Total RPC Emissions:		VOC	HCHO	n-Hex,BTEX (Ea)	Total HAP	CO2	CH4	CO2e
lb/hr	tpy	4.89	2.7E-03	0.01	0.03	5.5	3	70
tpy	tpy	4.87	2.7E-03	0.01	0.03	24	11	306

Notes:

1 - Misc. equipment leaks is a broad category covering leaks of natural gas from sealed surfaces, such as packing and gaskets, resulting from the wear of mechanical joints, seals, and rotating surfaces over time. It also includes the crankcase emissions from reciprocating engines.

2 - To be conservative, and to account for potential future changes, the following "worst-case" gas characteristics were assumed:

Pollutant	Gas Analysis	Worst-Case Assumption
CO2	154 lb/MMscf	200 lb/MMscf
CH4	30,455 lb/MMscf	37,000 lb/MMscf
VOC	14,087 lb/MMscf	16,100 lb/MMscf
n-Hex, BTEX, TMP (ea)	58 lb/MMscf	72 lb/MMscf
Total HAP	348 lb/MMscf	430 lb/MMscf

3 - Estimates of Recip Compressor Leaks are based on vendor data w/ an appropriate contingency.

4 - Engine crankcase emissions are based on vendor data: "As a general rule, blow-by (i.e., crankcase emissions) on a new engine is approximately 0.5 scf/bhp-hr." A "safety factor" is used to account for increasing blow-by as the engines "wear".

5 - Crankcase emissions are estimated as follows:

(Data from CAT G3306TA Data Sheet and Emissions Calculation Spreadsheet.)

Tot Eng Exhaust (TEEx) (Vol) 970 acf/min 177 MMscf/yr TEEx*

Pollutant	Alax-2802LE PTE	Crankcase Emission Factor**
Crankcase THC emissions (Mass)	4.35 tpy THC	48.27 lb THC / MMscf TEEx
Crankcase VOC emissions (Mass)	1.22 tpy VOC	13.76 lb VOC / MMscf TEEx
Crankcase HCHO emissions (Mass)	0.49 tpy HCHC	5.55 lb HCHO / MMscf TEEx
Crankcase n-Hex, BTEX, TMP (ea) (Mass)	0.02 tpy BTEX	0.18 lb BTEX / MMscf TEEx
Crankcase HAP (tot) emissions (Mass)	0.58 tpy HAP	6.62 lb HAP / MMscf TEEx
Crankcase CO2 emissions (Mass)	1,002 tpy CO2	11,342 lb CO2 / MMscf TEEx
Crankcase CH4 emissions (Mass)	2 tpy CH4	23 lb CH4 / MMscf TEEx
Crankcase CO2e emissions (Mass)	1,052 tpy CO2e	11,914 lb CO2e / MMscf TEEx

* Conversion from acf/min to scf/yr based 1,064 of exhaust temp, and 68 of std temp.

** Crankcase EmFact = PTE (tpy) from CAT G3306TA + Tot Engine Exhaust (TEEx) (MMscf/yr).

Piping and Equipment Fugitives - Gas & Water/Oil

Unit ID (Point ID)	Description	Component (Unit) Type (Gas)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	Hydrocarbons (THC) lb/hr	VOC lb/hr	n-Hexane lb/hr	BTEX, TMP-ea lb/hr	Total HAP lb/hr	CO2 lb/hr	CH4 lb/hr	CO2e GWP = 25 lb/hr tpy	
FUG-G (1F)	Process Piping Fugitives (Gas)	Valves	386	0.00992	0%	3.82	16.75	0.03	3.9E-04	0.03	0.01	2.87	72	
		Pump Seals	0	—	—	—	—	—	—	—	—	—	—	—
		Other	45	0.01940	0%	0.87	3.82	6.0E-03	9.0E-05	6.4E-03	3.0E-03	0.01	0.65	16
		Connectors	1,106	0.00044	0%	0.49	2.13	3.3E-03	5.0E-05	2.2E-04	3.6E-03	0.02	0.37	9
		Flanges	180	0.00086	0%	0.15	0.68	1.1E-03	1.6E-03	7.0E-05	1.1E-03	5.0E-03	0.12	0.51
		Open-ended	21	0.00441	0%	0.09	0.41	6.3E-04	9.5E-06	4.2E-05	6.8E-04	3.0E-03	0.07	0.30
Pre-Controlled:						5.43	23.79	0.04	5.6E-04	0.04	0.02	4.07	102	
Controlled:						5.43	23.79	0.04	5.6E-04	0.04	0.02	4.07	102	

Unit ID (Point ID)	Description	Component (Unit) Type (Water/Oil)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	Hydrocarbons (THC) lb/hr	VOC lb/hr	n-Hexane lb/hr	BTEX, TMP-ea lb/hr	Total HAP lb/hr	CO2 lb/hr	CH4 lb/hr	CO2e GWP = 25 lb/hr tpy
FUG-W (2F)	Process Piping Fugitives (Water/Oil)	Valves	193	0.00022	0%	0.04	0.18	4.2E-03	1.2E-03	1.0E-02	4.2E-04	0.01	0.05
		Pump Seals	4	0.00005	0%	2.1E-04	9.3E-04	2.1E-05	9.3E-05	5.3E-05	2.3E-04	2.1E-06	6.3E-05
		Other	23	0.03086	0%	0.69	3.04	6.9E-02	3.0E-01	2.1E-02	9.1E-02	1.7E-01	7.6E-01
		Connectors	553	0.00024	0%	0.13	0.59	1.3E-02	5.9E-02	4.0E-03	1.8E-02	3.4E-02	0.15
		Flanges	90	0.00001	0%	5.8E-04	2.5E-03	5.8E-05	2.5E-04	1.7E-05	7.6E-05	1.4E-04	6.3E-04
		Open-ended	11	0.00055	0%	5.8E-03	0.03	8.8E-02	3.84	2.6E-02	0.12	0.22	0.96
Pre-Controlled:						0.88	3.84	8.8E-02	3.84	0.03	0.12	0.22	0.96
Controlled:						0.88	3.84	8.8E-02	3.84	0.03	0.12	0.22	0.96

TOTAL PRE-CONTROLLED FUGITIVE EMISSIONS:

TOTAL CONTROLLED FUGITIVE EMISSIONS:

Notes: 1 - Assumed 8,760 hours per year of fugitive emissions.

2 - Gas and Water/Oil emissions calculated using EPA Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, Nov 1995.

3 - Component in Gas Service are based on GR-HAPCalc estimates, plus a margin

4 - Component in Water/Oil Service are based on Gas Component count, times a reduction

5 - "Other" components include compressor seals, relief valves, diaphragms, drains, meters, etc.

6 - To be conservative, the following gas characteristics were assumed:

Gas	kg/hr	Water/Oil	lb/hr
Valves	4.5E-03	0.00992	9.8E-05
Pump Seals	na	na	2.4E-05
Others	8.8E-03	0.01940	1.4E-02
Connectors	2.0E-04	0.00044	1.1E-04
Flanges	3.9E-04	0.00086	2.9E-06
Open-Ended Lines	2.0E-03	0.00441	2.5E-04

Pollutant	Gas		Water/Oil	
	Analysis	Estimated	Analysis	Estimated
Carbon Dioxide	0.26 Wgt%	0.34 Wgt%	— Wgt%	— Wgt%
Methane	52.18 Wgt%	75.00 Wgt%	— Wgt%	— Wgt%
VOC	24.14 Wgt%	25.00 Wgt%	— Wgt%	100.00 Wgt%
n-Hexane	0.57 Wgt%	0.69 Wgt%	— Wgt%	10.00 Wgt%
BTEX, TMP-ea	0.01 Wgt%	0.01 Wgt%	— Wgt%	3.00 Wgt%
Total HAP	0.60 Wgt%	0.74 Wgt%	— Wgt%	25.00 Wgt%

Potentially Applicable
AP-42 and GHG EMISSION FACTORS
(Preferentially use test data or vendor data where available)

Pollutant		GAS-FIRED ENGINES AP-42 Table 3.1-1a, 3.1-2a, 3.1-3, 3.1-4, 3.1-5, 3.1-6, 3.1-7, 3.1-8, 3.1-9, 3.1-10, 3.1-11, 3.1-12, 3.1-13, 3.1-14, 3.1-15, 3.1-16, 3.1-17, 3.1-18, 3.1-19, 3.1-20, 3.1-21, 3.1-22, 3.1-23, 3.1-24, 3.1-25, 3.1-26, 3.1-27, 3.1-28, 3.1-29, 3.1-30, 3.1-31, 3.1-32, 3.1-33, 3.1-34, 3.1-35, 3.1-36, 3.1-37, 3.1-38, 3.1-39, 3.1-40, 3.1-41, 3.1-42, 3.1-43, 3.1-44, 3.1-45, 3.1-46, 3.1-47, 3.1-48, 3.1-49, 3.1-50, 3.1-51, 3.1-52, 3.1-53, 3.1-54, 3.1-55, 3.1-56, 3.1-57, 3.1-58, 3.1-59, 3.1-60, 3.1-61, 3.1-62, 3.1-63, 3.1-64, 3.1-65, 3.1-66, 3.1-67, 3.1-68, 3.1-69, 3.1-70, 3.1-71, 3.1-72, 3.1-73, 3.1-74, 3.1-75, 3.1-76, 3.1-77, 3.1-78, 3.1-79, 3.1-80, 3.1-81, 3.1-82, 3.1-83, 3.1-84, 3.1-85, 3.1-86, 3.1-87, 3.1-88, 3.1-89, 3.1-90, 3.1-91, 3.1-92, 3.1-93, 3.1-94, 3.1-95, 3.1-96, 3.1-97, 3.1-98, 3.1-99, 3.1-100			GAS-FIRED TURBINES AP-42 Table 3.1-1, 3.1-2a, 3.1-3, 3.1-4, 3.1-5, 3.1-6, 3.1-7, 3.1-8, 3.1-9, 3.1-10, 3.1-11, 3.1-12, 3.1-13, 3.1-14, 3.1-15, 3.1-16, 3.1-17, 3.1-18, 3.1-19, 3.1-20, 3.1-21, 3.1-22, 3.1-23, 3.1-24, 3.1-25, 3.1-26, 3.1-27, 3.1-28, 3.1-29, 3.1-30, 3.1-31, 3.1-32, 3.1-33, 3.1-34, 3.1-35, 3.1-36, 3.1-37, 3.1-38, 3.1-39, 3.1-40, 3.1-41, 3.1-42, 3.1-43, 3.1-44, 3.1-45, 3.1-46, 3.1-47, 3.1-48, 3.1-49, 3.1-50, 3.1-51, 3.1-52, 3.1-53, 3.1-54, 3.1-55, 3.1-56, 3.1-57, 3.1-58, 3.1-59, 3.1-60, 3.1-61, 3.1-62, 3.1-63, 3.1-64, 3.1-65, 3.1-66, 3.1-67, 3.1-68, 3.1-69, 3.1-70, 3.1-71, 3.1-72, 3.1-73, 3.1-74, 3.1-75, 3.1-76, 3.1-77, 3.1-78, 3.1-79, 3.1-80, 3.1-81, 3.1-82, 3.1-83, 3.1-84, 3.1-85, 3.1-86, 3.1-87, 3.1-88, 3.1-89, 3.1-90, 3.1-91, 3.1-92, 3.1-93, 3.1-94, 3.1-95, 3.1-96, 3.1-97, 3.1-98, 3.1-99, 3.1-100		
		2SLB lb/MMBtu	4SLB lb/MMBtu	4SRB lb/MMBtu	Uncontrolled lb/MMBtu	Water Injection lb/MMBtu	Lean Pre-Mix lb/MMBtu
CRITERIA	NOX (≥ 90% Load)	5.17E+00	4.08E+00	2.21E+00	3.20E-01	1.30E-01	9.90E-02
	CO (≥ 90% Load)	3.88E-01	3.17E-01	3.72E+00	8.20E-02	3.00E-02	1.50E-02
	THC (TOC)	1.84E+00	1.47E+00	3.58E-01	1.10E-02	1.10E-02	1.10E-02
	NMHC (THC-CH4)	1.90E-01	2.20E-01	1.28E-01	2.40E-03	2.40E-03	2.40E-03
	NMNEHC (NMHC-C2H6)	1.19E-01	1.15E-01	5.76E-02	2.10E-03	2.10E-03	2.10E-03
	VOC	1.20E-01	1.18E-01	2.96E-02	2.10E-03	2.10E-03	2.10E-03
	SO2*** (2,000 gr-S/MMscf)	5.88E-04	5.88E-04	5.88E-04	5.88E-04	5.88E-04	5.88E-04
HAPs	PM10/2.5 (Filter+Cond)	4.83E-02	9.89E-03	1.84E-02	6.80E-03	6.80E-03	6.60E-03
	Benzene	1.94E-03	4.40E-04	1.58E-03	1.20E-05	1.20E-05	9.10E-07
	Ethylbenzene	1.08E-04	3.97E-05	2.48E-05	3.20E-05	3.20E-05	3.20E-05
	Formaldehyde (HCHO)	5.52E-02	5.28E-02	2.05E-02	7.10E-04	7.10E-04	2.00E-05
	n-Hexane	4.45E-04	1.11E-03	---	---	---	---
	Toluene	9.63E-04	4.08E-04	5.58E-04	1.30E-04	1.30E-04	1.30E-04
	TMP, 2,2,4- (l-Octane)	8.46E-04	2.50E-04	---	---	---	---
	Xylenes	2.88E-04	1.84E-04	1.95E-04	6.40E-05	6.40E-05	6.40E-05
	Other HAPs	1.96E-02	1.89E-02	9.42E-03	1.08E-04	1.08E-04	1.08E-04
	GHG	CO2**** (GWP=1)	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02
CH4 (GWP=25)		1.45E+00	1.25E+00	2.30E-01	8.60E-03	8.60E-03	8.60E-03
N2O (GWP=298)		2.20E-04	2.20E-04	2.20E-04	3.00E-03	3.00E-03	3.00E-03
CO2e		1.53E+02	1.48E+02	1.23E+02	1.18E+02	1.18E+02	1.18E+02

(#Lean Pre-Mix - aka: Dry Low Emissions (DLE or DLN) and SoLoNOx)

Pollutant		GAS-FIRED EXTERNAL COMBUSTION AP-42 Table 4.1-1, 4.2-1, 4.3-1, 4.4-1, 4.5-1, 4.6-1, 4.7-1, 4.8-1, 4.9-1, 4.10-1, 4.11-1, 4.12-1, 4.13-1, 4.14-1, 4.15-1, 4.16-1, 4.17-1, 4.18-1, 4.19-1, 4.20-1, 4.21-1, 4.22-1, 4.23-1, 4.24-1, 4.25-1, 4.26-1, 4.27-1, 4.28-1, 4.29-1, 4.30-1, 4.31-1, 4.32-1, 4.33-1, 4.34-1, 4.35-1, 4.36-1, 4.37-1, 4.38-1, 4.39-1, 4.40-1, 4.41-1, 4.42-1, 4.43-1, 4.44-1, 4.45-1, 4.46-1, 4.47-1, 4.48-1, 4.49-1, 4.50-1, 4.51-1, 4.52-1, 4.53-1, 4.54-1, 4.55-1, 4.56-1, 4.57-1, 4.58-1, 4.59-1, 4.60-1, 4.61-1, 4.62-1, 4.63-1, 4.64-1, 4.65-1, 4.66-1, 4.67-1, 4.68-1, 4.69-1, 4.70-1, 4.71-1, 4.72-1, 4.73-1, 4.74-1, 4.75-1, 4.76-1, 4.77-1, 4.78-1, 4.79-1, 4.80-1, 4.81-1, 4.82-1, 4.83-1, 4.84-1, 4.85-1, 4.86-1, 4.87-1, 4.88-1, 4.89-1, 4.90-1, 4.91-1, 4.92-1, 4.93-1, 4.94-1, 4.95-1, 4.96-1, 4.97-1, 4.98-1, 4.99-1, 4.100-1			FLARES 13.1-1, 13.1-2, 13.1-3, 13.1-4, 13.1-5, 13.1-6, 13.1-7, 13.1-8, 13.1-9, 13.1-10, 13.1-11, 13.1-12, 13.1-13, 13.1-14, 13.1-15, 13.1-16, 13.1-17, 13.1-18, 13.1-19, 13.1-20, 13.1-21, 13.1-22, 13.1-23, 13.1-24, 13.1-25, 13.1-26, 13.1-27, 13.1-28, 13.1-29, 13.1-30, 13.1-31, 13.1-32, 13.1-33, 13.1-34, 13.1-35, 13.1-36, 13.1-37, 13.1-38, 13.1-39, 13.1-40, 13.1-41, 13.1-42, 13.1-43, 13.1-44, 13.1-45, 13.1-46, 13.1-47, 13.1-48, 13.1-49, 13.1-50, 13.1-51, 13.1-52, 13.1-53, 13.1-54, 13.1-55, 13.1-56, 13.1-57, 13.1-58, 13.1-59, 13.1-60, 13.1-61, 13.1-62, 13.1-63, 13.1-64, 13.1-65, 13.1-66, 13.1-67, 13.1-68, 13.1-69, 13.1-70, 13.1-71, 13.1-72, 13.1-73, 13.1-74, 13.1-75, 13.1-76, 13.1-77, 13.1-78, 13.1-79, 13.1-80, 13.1-81, 13.1-82, 13.1-83, 13.1-84, 13.1-85, 13.1-86, 13.1-87, 13.1-88, 13.1-89, 13.1-90, 13.1-91, 13.1-92, 13.1-93, 13.1-94, 13.1-95, 13.1-96, 13.1-97, 13.1-98, 13.1-99, 13.1-100		DIESEL ENGINES 3.1-1, 3.1-2, 3.1-3, 3.1-4, 3.1-5, 3.1-6, 3.1-7, 3.1-8, 3.1-9, 3.1-10, 3.1-11, 3.1-12, 3.1-13, 3.1-14, 3.1-15, 3.1-16, 3.1-17, 3.1-18, 3.1-19, 3.1-20, 3.1-21, 3.1-22, 3.1-23, 3.1-24, 3.1-25, 3.1-26, 3.1-27, 3.1-28, 3.1-29, 3.1-30, 3.1-31, 3.1-32, 3.1-33, 3.1-34, 3.1-35, 3.1-36, 3.1-37, 3.1-38, 3.1-39, 3.1-40, 3.1-41, 3.1-42, 3.1-43, 3.1-44, 3.1-45, 3.1-46, 3.1-47, 3.1-48, 3.1-49, 3.1-50, 3.1-51, 3.1-52, 3.1-53, 3.1-54, 3.1-55, 3.1-56, 3.1-57, 3.1-58, 3.1-59, 3.1-60, 3.1-61, 3.1-62, 3.1-63, 3.1-64, 3.1-65, 3.1-66, 3.1-67, 3.1-68, 3.1-69, 3.1-70, 3.1-71, 3.1-72, 3.1-73, 3.1-74, 3.1-75, 3.1-76, 3.1-77, 3.1-78, 3.1-79, 3.1-80, 3.1-81, 3.1-82, 3.1-83, 3.1-84, 3.1-85, 3.1-86, 3.1-87, 3.1-88, 3.1-89, 3.1-90, 3.1-91, 3.1-92, 3.1-93, 3.1-94, 3.1-95, 3.1-96, 3.1-97, 3.1-98, 3.1-99, 3.1-100	
		Uncontrolled lb/MMBtu	LoNOx Burners lb/MMBtu	Flue Gas Recirc lb/MMBtu	(Combustion) lb/MMBtu	Uncontrolled lb/MMBtu		
CRITERIA	NOX	9.60E-02	4.90E-02	3.14E-02	6.80E-02	4.41E+00		
	CO	8.24E-02	8.24E-02	8.24E-02	3.70E-01	9.50E-01		
	THC (TOC)	1.08E-02	1.08E-02	1.08E-02	1.40E-01	3.60E-01		
	NMHC (THC-CH4)	8.53E-03	8.53E-03	8.53E-03	1.38E-01	3.53E-01		
	NMNEHC (NMHC-C2H6)	5.49E-03	5.49E-03	5.49E-03	5.49E-03	3.50E-01		
	VOC	5.56E-03	5.56E-03	5.56E-03	5.56E-03	3.60E-01		
	SO2 (2,000 gr-S/MMscf)	5.88E-04	5.88E-04	5.88E-04	5.88E-04	2.90E-01		
HAPs	PM10/2.5 (Filter+Condense)	7.45E-03	7.45E-03	7.45E-03	7.45E-03	3.10E-01		
	Benzene	2.06E-06	2.06E-06	2.06E-06	2.06E-06	9.33E-04		
	Ethylbenzene	---	---	---	---	---		
	HCHO (Formaldehyde)	7.35E-05	7.35E-05	7.35E-05	7.35E-05	1.18E-03		
	n-Hexane	1.76E-03	1.76E-03	1.76E-03	1.76E-03	---		
	Toluene	3.33E-06	3.33E-06	3.33E-06	3.33E-06	4.09E-04		
	2,2,4-TMP (l-Octane)	---	---	---	---	---		
	Xylenes	---	---	---	---	2.85E-04		
GHG	Other HAPs	1.86E-06	1.86E-06	1.86E-06	1.86E-06	1.05E-03		
	CO2 (GWP=1)	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.64E+02		
	CH4 (GWP=25)	2.25E-03	2.25E-03	2.25E-03	2.25E-03	6.61E-03		
	N2O (GWP=298)	2.16E-03	6.27E-04	6.27E-04	2.16E-03	1.32E-03		
CO2e	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.65E+02			

Fuel Type	40 CFR 99 - DEFAULT EMISSION FACTORS Table C-1 to Subpart C of Part 99		Table C-2 to Subpart C of Part 99	
	Default HHV	Carbon Dioxide lb CO2/MMBtu	Methane lb CH4/MMBtu	Nitrous Oxide lb N2O/MMBtu
Fuel Oil No. 2 (Diesel)	0.138 MMBtu/gal	1.61E+02	6.61E-03	1.32E-03
Natural Gas	1.028 MMBtu/scf	1.17E+02	2.20E-03	2.20E-04

Global Warming Potential (100 Yr) (GWP) Table A-1 to Subpart A of Part 99		
CO2	CH4	N2O
1	25	298

#Revised by EPA on 11/28/13

Conversion Factors
<http://www.onlineconversion.com/>

1.0 lb =	453.592 g
1.0 kg =	2.205 lb
1.0 hp =	2,544.433 Btu/hr
1.0 hp =	745.700 Watt
1.0 kW =	3,412.142 Btu/hr
1.0 kW-hr =	1,340 hp-hr
1.0 cf =	7.481 gal
1.0 gal H2O =	8.338 gal
1.0 cf H2O =	62.371 gal
1.0 m =	3.281 gal
1.0 km =	0.621 gal
1.0 acre =	43560.174 gal
1.0 °F =	(°C*9/5)+32
1.0 °R =	°F+459.67
1.0 % =	10,000 ppm
UGC (stp) =	379.48 scf/lb-mol

*Converted Ext Comb Emission Factors to lb/MMBtu by dividing lb/MMscf by AP-42 default HHV of 1,020 Btu/scf.
**Converted GHG Emission Factors to lb/MMBtu by multiplying kg/MMBtu by 2.2046 lb/kg.
***Assumes 100% conversion of fuel sulfur to SO2 (2,000 gr/MMscf).
****Assumes 99.5% conversion of fuel carbon to CO2 for natural gas.

Case Name: Taylor CS - 7.0 MMscfd Dehy-01

File Name: C:\projects2\wfs\OVM\Taylor\R13 Application #2\Taylor 7.0 Dehy - 02.18.15.ddf

Date: February 18, 2015

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.3751	9.003	1.6431
Ethane	0.8333	19.999	3.6498
Propane	0.9414	22.594	4.1234
Isobutane	0.2508	6.020	1.0986
n-Butane	0.8663	20.792	3.7946
Isopentane	0.2812	6.748	1.2315
n-Pentane	0.4473	10.734	1.9590
n-Hexane	0.2827	6.785	1.2383
Cyclohexane	0.2452	5.884	1.0739
Other Hexanes	0.2855	6.852	1.2504
Heptanes	0.3968	9.523	1.7380
Methylcyclohexane	0.1692	4.061	0.7411
2,2,4-Trimethylpentane	0.0011	0.026	0.0047
Benzene	0.1725	4.139	0.7555
Toluene	0.3644	8.745	1.5960
Ethylbenzene	0.0775	1.859	0.3394
Xylenes	0.2499	5.999	1.0947
C8+ Heavies	0.1672	4.012	0.7322
Total Emissions	6.4074	153.777	28.0643
Total Hydrocarbon Emissions	6.4074	153.777	28.0643
Total VOC Emissions	5.1989	124.774	22.7713
Total HAP Emissions	1.1481	27.554	5.0286
Total BTEX Emissions	0.8643	20.743	3.7856

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	11.0277	264.666	48.3015
Ethane	5.6886	136.528	24.9163
Propane	2.7425	65.819	12.0119
Isobutane	0.4229	10.149	1.8522
n-Butane	1.0426	25.022	4.5665
Isopentane	0.2695	6.467	1.1803
n-Pentane	0.3219	7.726	1.4100
n-Hexane	0.0979	2.350	0.4289
Cyclohexane	0.0200	0.479	0.0875
Other Hexanes	0.1377	3.304	0.6029
Heptanes	0.0575	1.380	0.2518
Methylcyclohexane	0.0098	0.234	0.0427
2,2,4-Trimethylpentane	0.0003	0.008	0.0015
Benzene	0.0015	0.035	0.0064
Toluene	0.0017	0.042	0.0076
Ethylbenzene	0.0002	0.005	0.0008
Xylenes	0.0004	0.010	0.0018
C8+ Heavies	0.0044	0.104	0.0191
Total Emissions	21.8470	524.327	95.6898

Total Hydrocarbon Emissions	21.8470	524.327	95.6898
Total VOC Emissions	5.1306	123.134	22.4720
Total HAP Emissions	0.1021	2.450	0.4470
Total BTEX Emissions	0.0038	0.091	0.0166

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	22.0555	529.331	96.6030
Ethane	11.3773	273.055	49.8326
Propane	5.4849	131.638	24.0239
Isobutane	0.8458	20.298	3.7045
n-Butane	2.0851	50.043	9.1329
Isopentane	0.5389	12.935	2.3606
n-Pentane	0.6438	15.452	2.8200
n-Hexane	0.1959	4.701	0.8579
Cyclohexane	0.0399	0.958	0.1749
Other Hexanes	0.2753	6.608	1.2059
Heptanes	0.1150	2.760	0.5037
Methylcyclohexane	0.0195	0.468	0.0855
2,2,4-Trimethylpentane	0.0007	0.017	0.0030
Benzene	0.0029	0.071	0.0129
Toluene	0.0035	0.083	0.0152
Ethylbenzene	0.0004	0.009	0.0017
Xylenes	0.0008	0.019	0.0035
C8+ Heavies	0.0087	0.209	0.0381
Total Emissions	43.6940	1048.655	191.3795
Total Hydrocarbon Emissions	43.6940	1048.655	191.3795
Total VOC Emissions	10.2612	246.268	44.9440
Total HAP Emissions	0.2041	4.899	0.8941
Total BTEX Emissions	0.0076	0.182	0.0332

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	11.4029	273.669	49.9446
Ethane	6.5219	156.527	28.5661
Propane	3.6839	88.413	16.1353
Isobutane	0.6737	16.169	2.9508
n-Butane	1.9089	45.814	8.3610
Isopentane	0.5506	13.215	2.4118
n-Pentane	0.7692	18.460	3.3690
n-Hexane	0.3807	9.136	1.6673
Cyclohexane	0.2652	6.364	1.1614
Other Hexanes	0.4231	10.155	1.8534
Heptanes	0.4543	10.903	1.9899
Methylcyclohexane	0.1790	4.295	0.7838
2,2,4-Trimethylpentane	0.0014	0.034	0.0062
Benzene	0.1739	4.175	0.7619
Toluene	0.3661	8.787	1.6036
Ethylbenzene	0.0777	1.864	0.3402
Xylenes	0.2503	6.008	1.0965
C8+ Heavies	0.1715	4.116	0.7513
Total Emissions	28.2543	678.104	123.7540

Total Hydrocarbon Emissions	28.2543	678.104	123.7540
Total VOC Emissions	10.3295	247.908	45.2433
Total HAP Emissions	1.2501	30.004	5.4757
Total BTEX Emissions	0.8681	20.834	3.8022

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Taylor CS - 7.0 MMscfd Dehy-01

File Name: C:\projects2\wfs\OVM\Taylor\R13 Application #2\Taylor 7.0 Dehy - 02.18.15.ddf

Date: February 18, 2015

DESCRIPTION:

Description: Wet Gas: 75oF, 1,000 psig
 Glycol Pump: Kimray 9015 PV, 1.5 gpm
 Flash Tank: 70 oF, 150 psig, 50% Recycle
 No Condenser, No Flare

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 75.00 deg. F
 Pressure: 1000.00 psig
 Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1328
Nitrogen	0.3936
Methane	72.0408
Ethane	17.7791
Propane	5.8624
Isobutane	0.7029
n-Butane	1.7059
Isopentane	0.3976
n-Pentane	0.4748
n-Hexane	0.1454
Cyclohexane	0.0286
Other Hexanes	0.1940
Heptanes	0.0984
Methylcyclohexane	0.0166
2,2,4-Trimethylpentane	0.0005
Benzene	0.0022
Toluene	0.0031
Ethylbenzene	0.0005
Xylenes	0.0012
C8+ Heavies	0.0206

DRY GAS:

Flow Rate: 7.0 MMSCF/day
 Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
 Water Content: 1.5 wt% H2O
 Flow Rate: 1.5 gpm

PUMP:

Glycol Pump Type: Gas Injection
Gas Injection Pump Volume Ratio: 0.080 acfm gas/gpm glycol

FLASH TANK:

Flash Control: Combustion device
Flash Control Efficiency: 50.00 %
Temperature: 70.0 deg. F
Pressure: 150.0 psig

Case Name: Taylor CS - 7.0 MMscfd Dehy-01

File Name: C:\projects2\wfs\OVM\Taylor\R13 Application #2\Taylor 7.0 Dehy - 02.18.15.ddf

Date: February 18, 2015

DESCRIPTION:

Description: Wet Gas: 75oF, 1,000 psig
 Glycol Pump: Kimray 9015 PV, 1.5 gpm
 Flash Tank: 70 oF, 150 psig, 50% Recycle
 No Condenser, No Flare

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.3751	9.003	1.6431
Ethane	0.8333	19.999	3.6498
Propane	0.9414	22.594	4.1234
Isobutane	0.2508	6.020	1.0986
n-Butane	0.8663	20.792	3.7946
Isopentane	0.2812	6.748	1.2315
n-Pentane	0.4473	10.734	1.9590
n-Hexane	0.2827	6.785	1.2383
Cyclohexane	0.2452	5.884	1.0739
Other Hexanes	0.2855	6.852	1.2504
Heptanes	0.3968	9.523	1.7380
Methylcyclohexane	0.1692	4.061	0.7411
2,2,4-Trimethylpentane	0.0011	0.026	0.0047
Benzene	0.1725	4.139	0.7555
Toluene	0.3644	8.745	1.5960
Ethylbenzene	0.0775	1.859	0.3394
Xylenes	0.2499	5.999	1.0947
C8+ Heavies	0.1672	4.012	0.7322
Total Emissions	6.4074	153.777	28.0643
Total Hydrocarbon Emissions	6.4074	153.777	28.0643
Total VOC Emissions	5.1989	124.774	22.7713
Total HAP Emissions	1.1481	27.554	5.0286
Total BTEX Emissions	0.8643	20.743	3.7856

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	11.0277	264.666	48.3015
Ethane	5.6886	136.528	24.9163
Propane	2.7425	65.819	12.0119
Isobutane	0.4229	10.149	1.8522
n-Butane	1.0426	25.022	4.5665
Isopentane	0.2695	6.467	1.1803
n-Pentane	0.3219	7.726	1.4100
n-Hexane	0.0979	2.350	0.4289

Cyclohexane	0.0200	0.479	0.0875
Other Hexanes	0.1377	3.304	0.6029
Heptanes	0.0575	1.380	0.2518
Methylcyclohexane	0.0098	0.234	0.0427
2,2,4-Trimethylpentane	0.0003	0.008	0.0015
Benzene	0.0015	0.035	0.0064
Toluene	0.0017	0.042	0.0076
Ethylbenzene	0.0002	0.005	0.0008
Xylenes	0.0004	0.010	0.0018
C8+ Heavies	0.0044	0.104	0.0191

Total Emissions	21.8470	524.327	95.6898
Total Hydrocarbon Emissions	21.8470	524.327	95.6898
Total VOC Emissions	5.1306	123.134	22.4720
Total HAP Emissions	0.1021	2.450	0.4470
Total BTEX Emissions	0.0038	0.091	0.0166

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	22.0555	529.331	96.6030
Ethane	11.3773	273.055	49.8326
Propane	5.4849	131.638	24.0239
Isobutane	0.8458	20.298	3.7045
n-Butane	2.0851	50.043	9.1329
Isopentane	0.5389	12.935	2.3606
n-Pentane	0.6438	15.452	2.8200
n-Hexane	0.1959	4.701	0.8579
Cyclohexane	0.0399	0.958	0.1749
Other Hexanes	0.2753	6.608	1.2059
Heptanes	0.1150	2.760	0.5037
Methylcyclohexane	0.0195	0.468	0.0855
2,2,4-Trimethylpentane	0.0007	0.017	0.0030
Benzene	0.0029	0.071	0.0129
Toluene	0.0035	0.083	0.0152
Ethylbenzene	0.0004	0.009	0.0017
Xylenes	0.0008	0.019	0.0035
C8+ Heavies	0.0087	0.209	0.0381

Total Emissions	43.6940	1048.655	191.3795
Total Hydrocarbon Emissions	43.6940	1048.655	191.3795
Total VOC Emissions	10.2612	246.268	44.9440
Total HAP Emissions	0.2041	4.899	0.8941
Total BTEX Emissions	0.0076	0.182	0.0332

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	11.4029	273.669	49.9446
Ethane	6.5219	156.527	28.5661
Propane	3.6839	88.413	16.1353
Isobutane	0.6737	16.169	2.9508
n-Butane	1.9089	45.814	8.3610
Isopentane	0.5506	13.215	2.4118
n-Pentane	0.7692	18.460	3.3690
n-Hexane	0.3807	9.136	1.6673

Cyclohexane	0.2652	6.364	1.1614
Other Hexanes	0.4231	10.155	1.8534
Heptanes	0.4543	10.903	1.9899
Methylcyclohexane	0.1790	4.295	0.7838
2,2,4-Trimethylpentane	0.0014	0.034	0.0062
Benzene	0.1739	4.175	0.7619
Toluene	0.3661	8.787	1.6036
Ethylbenzene	0.0777	1.864	0.3402
Xylenes	0.2503	6.008	1.0965
C8+ Heavies	0.1715	4.116	0.7513

Total Emissions	28.2543	678.104	123.7540
Total Hydrocarbon Emissions	28.2543	678.104	123.7540
Total VOC Emissions	10.3295	247.908	45.2433
Total HAP Emissions	1.2501	30.004	5.4757
Total BTEX Emissions	0.8681	20.834	3.8022

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction

Methane	98.2461	49.9446	49.16
Ethane	53.4824	28.5661	46.59
Propane	28.1473	16.1353	42.68
Isobutane	4.8031	2.9508	38.56
n-Butane	12.9275	8.3610	35.32
Isopentane	3.5921	2.4118	32.86
n-Pentane	4.7789	3.3690	29.50
n-Hexane	2.0962	1.6673	20.46
Cyclohexane	1.2488	1.1614	7.00
Other Hexanes	2.4563	1.8534	24.55
Heptanes	2.2417	1.9899	11.23
Methylcyclohexane	0.8266	0.7838	5.17
2,2,4-Trimethylpentane	0.0077	0.0062	19.51
Benzene	0.7683	0.7619	0.84
Toluene	1.6112	1.6036	0.47
Ethylbenzene	0.3410	0.3402	0.24
Xylenes	1.0983	1.0965	0.16
C8+ Heavies	0.7703	0.7513	2.47

Total Emissions	219.4438	123.7540	43.61
Total Hydrocarbon Emissions	219.4438	123.7540	43.61
Total VOC Emissions	67.7153	45.2433	33.19
Total HAP Emissions	5.9227	5.4757	7.55
Total BTEX Emissions	3.8188	3.8022	0.43

EQUIPMENT REPORTS:

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
 Calculated Dry Gas Dew Point: 1.05 lbs. H2O/MMSCF

Temperature: 75.0 deg. F
 Pressure: 1000.0 psig
 Dry Gas Flow Rate: 7.0000 MMSCF/day
 Glycol Losses with Dry Gas: 0.1069 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 27.70 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 11.58 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	3.79%	96.21%
Carbon Dioxide	99.64%	0.36%
Nitrogen	99.97%	0.03%
Methane	99.97%	0.03%
Ethane	99.93%	0.07%
Propane	99.90%	0.10%
Isobutane	99.88%	0.12%
n-Butane	99.84%	0.16%
Isopentane	99.86%	0.14%
n-Pentane	99.81%	0.19%
n-Hexane	99.73%	0.27%
Cyclohexane	98.69%	1.31%
Other Hexanes	99.79%	0.21%
Heptanes	99.55%	0.45%
Methylcyclohexane	98.72%	1.28%
2,2,4-Trimethylpentane	99.82%	0.18%
Benzene	86.95%	13.05%
Toluene	83.48%	16.52%
Ethylbenzene	81.15%	18.85%
Xylenes	74.63%	25.37%
C8+ Heavies	99.58%	0.42%

FLASH TANK

Flash Control: Combustion device
 Flash Control Efficiency: 50.00 %
 Flash Temperature: 70.0 deg. F
 Flash Pressure: 150.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.98%	0.02%
Carbon Dioxide	23.81%	76.19%
Nitrogen	1.65%	98.35%
Methane	1.67%	98.33%
Ethane	6.82%	93.18%
Propane	14.65%	85.35%
Isobutane	22.87%	77.13%
n-Butane	29.35%	70.65%
Isopentane	34.41%	65.59%
n-Pentane	41.12%	58.88%
n-Hexane	59.19%	40.81%

Cyclohexane	86.38%	13.62%
Other Hexanes	51.14%	48.86%
Heptanes	77.61%	22.39%
Methylcyclohexane	90.01%	9.99%
2,2,4-Trimethylpentane	61.23%	38.77%
Benzene	98.41%	1.59%
Toluene	99.13%	0.87%
Ethylbenzene	99.57%	0.43%
Xylenes	99.72%	0.28%
C8+ Heavies	95.45%	4.55%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	61.90%	38.10%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.57%	99.43%
n-Pentane	0.55%	99.45%
n-Hexane	0.46%	99.54%
Cyclohexane	3.17%	96.83%
Other Hexanes	0.94%	99.06%
Heptanes	0.43%	99.57%
Methylcyclohexane	3.79%	96.21%
2,2,4-Trimethylpentane	1.08%	98.92%
Benzene	5.00%	95.00%
Toluene	7.87%	92.13%
Ethylbenzene	10.34%	89.66%
Xylenes	12.86%	87.14%
C8+ Heavies	8.55%	91.45%

STREAM REPORTS:

WET GAS STREAM

Temperature: 75.00 deg. F
 Pressure: 1014.70 psia
 Flow Rate: 2.92e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	5.84e-002	8.09e+000
Carbon Dioxide	1.33e-001	4.49e+001
Nitrogen	3.93e-001	8.48e+001
Methane	7.20e+001	8.89e+003

Ethane	1.78e+001	4.11e+003
Propane	5.86e+000	1.99e+003
Isobutane	7.02e-001	3.14e+002
n-Butane	1.70e+000	7.62e+002
Isopentane	3.97e-001	2.21e+002
n-Pentane	4.75e-001	2.63e+002
n-Hexane	1.45e-001	9.64e+001
Cyclohexane	2.86e-002	1.85e+001
Other Hexanes	1.94e-001	1.29e+002
Heptanes	9.83e-002	7.58e+001
Methylcyclohexane	1.66e-002	1.25e+001
2,2,4-Trimethylpentane	5.00e-004	4.39e-001
Benzene	2.20e-003	1.32e+000
Toluene	3.10e-003	2.20e+000
Ethylbenzene	5.00e-004	4.08e-001
Xylenes	1.20e-003	9.80e-001
C8+ Heavies	2.06e-002	2.70e+001

Total Components	100.00	1.70e+004

DRY GAS STREAM

Temperature: 75.00 deg. F
 Pressure: 1014.70 psia
 Flow Rate: 2.92e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.22e-003	3.07e-001
Carbon Dioxide	1.32e-001	4.48e+001
Nitrogen	3.94e-001	8.48e+001
Methane	7.21e+001	8.88e+003
Ethane	1.78e+001	4.11e+003
Propane	5.86e+000	1.99e+003
Isobutane	7.02e-001	3.14e+002
n-Butane	1.70e+000	7.61e+002
Isopentane	3.97e-001	2.20e+002
n-Pentane	4.74e-001	2.63e+002
n-Hexane	1.45e-001	9.61e+001
Cyclohexane	2.82e-002	1.83e+001
Other Hexanes	1.94e-001	1.28e+002
Heptanes	9.80e-002	7.55e+001
Methylcyclohexane	1.64e-002	1.24e+001
2,2,4-Trimethylpentane	4.99e-004	4.38e-001
Benzene	1.91e-003	1.15e+000
Toluene	2.59e-003	1.83e+000
Ethylbenzene	4.06e-004	3.31e-001
Xylenes	8.96e-004	7.31e-001
C8+ Heavies	2.05e-002	2.69e+001

Total Components	100.00	1.70e+004

LEAN GLYCOL STREAM

Temperature: 75.00 deg. F
 Flow Rate: 1.50e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	8.32e+002
Water	1.50e+000	1.27e+001
Carbon Dioxide	1.93e-012	1.63e-011
Nitrogen	3.14e-013	2.65e-012
Methane	8.88e-018	7.49e-017
Ethane	1.60e-007	1.35e-006
Propane	9.19e-009	7.76e-008
Isobutane	1.36e-009	1.15e-008
n-Butane	3.58e-009	3.02e-008
Isopentane	1.90e-004	1.60e-003
n-Pentane	2.93e-004	2.47e-003
n-Hexane	1.54e-004	1.30e-003
Cyclohexane	9.51e-004	8.03e-003
Other Hexanes	3.21e-004	2.71e-003
Heptanes	2.02e-004	1.71e-003
Methylcyclohexane	7.90e-004	6.67e-003
2,2,4-Trimethylpentane	1.39e-006	1.17e-005
Benzene	1.07e-003	9.07e-003
Toluene	3.69e-003	3.11e-002
Ethylbenzene	1.06e-003	8.94e-003
Xylenes	4.37e-003	3.69e-002
C8+ Heavies	1.85e-003	1.56e-002
Total Components	100.00	8.44e+002

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 75.00 deg. F
Pressure: 1014.70 psia
Flow Rate: 1.63e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.21e+001	8.32e+002
Water	2.27e+000	2.05e+001
Carbon Dioxide	2.94e-002	2.65e-001
Nitrogen	2.43e-002	2.19e-001
Methane	2.48e+000	2.24e+001
Ethane	1.35e+000	1.22e+001
Propane	7.12e-001	6.43e+000
Isobutane	1.21e-001	1.10e+000
n-Butane	3.27e-001	2.95e+000
Isopentane	9.10e-002	8.22e-001
n-Pentane	1.21e-001	1.09e+000
n-Hexane	5.32e-002	4.80e-001
Cyclohexane	3.25e-002	2.93e-001
Other Hexanes	6.24e-002	5.64e-001
Heptanes	5.69e-002	5.14e-001
Methylcyclohexane	2.16e-002	1.95e-001
2,2,4-Trimethylpentane	1.97e-004	1.78e-003
Benzene	2.04e-002	1.84e-001
Toluene	4.42e-002	3.99e-001
Ethylbenzene	9.61e-003	8.68e-002
Xylenes	3.19e-002	2.88e-001
C8+ Heavies	2.12e-002	1.92e-001

 Total Components 100.00 9.03e+002

FLASH TANK OFF GAS STREAM

 Temperature: 70.00 deg. F
 Pressure: 164.70 psia
 Flow Rate: 7.45e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.16e-002	4.11e-003
Carbon Dioxide	2.34e-001	2.02e-001
Nitrogen	3.92e-001	2.16e-001
Methane	7.00e+001	2.21e+001
Ethane	1.93e+001	1.14e+001
Propane	6.33e+000	5.48e+000
Isobutane	7.41e-001	8.46e-001
n-Butane	1.83e+000	2.09e+000
Isopentane	3.80e-001	5.39e-001
n-Pentane	4.54e-001	6.44e-001
n-Hexane	1.16e-001	1.96e-001
Cyclohexane	2.42e-002	3.99e-002
Other Hexanes	1.63e-001	2.75e-001
Heptanes	5.84e-002	1.15e-001
Methylcyclohexane	1.01e-002	1.95e-002
2,2,4-Trimethylpentane	3.08e-004	6.90e-004
Benzene	1.92e-003	2.94e-003
Toluene	1.91e-003	3.46e-003
Ethylbenzene	1.81e-004	3.77e-004
Xylenes	3.85e-004	8.02e-004
C8+ Heavies	2.60e-003	8.70e-003
Total Components	100.00	4.41e+001

FLASH TANK GLYCOL STREAM

 Temperature: 70.00 deg. F
 Flow Rate: 1.53e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.68e+001	8.32e+002
Water	2.38e+000	2.05e+001
Carbon Dioxide	7.36e-003	6.32e-002
Nitrogen	4.22e-004	3.63e-003
Methane	4.37e-002	3.75e-001
Ethane	9.71e-002	8.33e-001
Propane	1.10e-001	9.41e-001
Isobutane	2.92e-002	2.51e-001
n-Butane	1.01e-001	8.66e-001
Isopentane	3.29e-002	2.83e-001
n-Pentane	5.24e-002	4.50e-001
n-Hexane	3.31e-002	2.84e-001
Cyclohexane	2.95e-002	2.53e-001
Other Hexanes	3.36e-002	2.88e-001
Heptanes	4.64e-002	3.99e-001

Methylcyclohexane	2.05e-002	1.76e-001
2,2,4-Trimethylpentane	1.27e-004	1.09e-003
Benzene	2.11e-002	1.82e-001
Toluene	4.61e-002	3.96e-001
Ethylbenzene	1.01e-002	8.64e-002
Xylenes	3.34e-002	2.87e-001
C8+ Heavies	2.13e-002	1.83e-001

Total Components	100.00	8.59e+002

FLASH GAS EMISSIONS

Flow Rate: 1.82e+003 scfh
Control Method: Combustion Device
Control Efficiency: 50.00

Component	Conc. (vol%)	Loading (lb/hr)

Water	4.99e+001	4.31e+001
Carbon Dioxide	2.96e+001	6.26e+001
Nitrogen	1.60e-001	2.16e-001
Methane	1.43e+001	1.10e+001
Ethane	3.94e+000	5.69e+000
Propane	1.30e+000	2.74e+000
Isobutane	1.52e-001	4.23e-001
n-Butane	3.74e-001	1.04e+000
Isopentane	7.78e-002	2.69e-001
n-Pentane	9.30e-002	3.22e-001
n-Hexane	2.37e-002	9.79e-002
Cyclohexane	4.94e-003	2.00e-002
Other Hexanes	3.33e-002	1.38e-001
Heptanes	1.20e-002	5.75e-002
Methylcyclohexane	2.07e-003	9.76e-003
2,2,4-Trimethylpentane	6.30e-005	3.45e-004
Benzene	3.92e-004	1.47e-003
Toluene	3.91e-004	1.73e-003
Ethylbenzene	3.70e-005	1.89e-004
Xylenes	7.87e-005	4.01e-004
C8+ Heavies	5.32e-004	4.35e-003

Total Components	100.00	1.28e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 2.13e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)

Water	7.71e+001	7.80e+000
Carbon Dioxide	2.56e-001	6.32e-002
Nitrogen	2.31e-002	3.63e-003
Methane	4.16e+000	3.75e-001
Ethane	4.93e+000	8.33e-001
Propane	3.80e+000	9.41e-001
Isobutane	7.68e-001	2.51e-001
n-Butane	2.65e+000	8.66e-001

Isopentane	6.94e-001	2.81e-001
n-Pentane	1.10e+000	4.47e-001
n-Hexane	5.84e-001	2.83e-001
Cyclohexane	5.19e-001	2.45e-001
Other Hexanes	5.90e-001	2.85e-001
Heptanes	7.05e-001	3.97e-001
Methylcyclohexane	3.07e-001	1.69e-001
2,2,4-Trimethylpentane	1.68e-003	1.08e-003
Benzene	3.93e-001	1.72e-001
Toluene	7.04e-001	3.64e-001
Ethylbenzene	1.30e-001	7.75e-002
Xylenes	4.19e-001	2.50e-001
C8+ Heavies	1.75e-001	1.67e-001

Total Components	100.00	1.43e+001

Location:
 Condensate Volume:
 Total VOC's:

Taylor CRP
 2543.174 bb/yr
 0.04 ton/yr

Emissions to Atmosphere		
Component	tons/year	mass fraction
Water	0.01	100.00
TEG	0.00	0.00
Nitrogen	0.00	0.00
Methane	0.47	0.00
CO2	0.02	0.00
Ethane	0.12	0.00
Propane	0.03	0.00
i-Butane	0.00	0.00
n-Butane	0.01	0.00
i-Pentane	0.00	0.00
n-Pentane	0.00	0.00
2,2-Dimethylbutane	0.00	0.00
2,3-Dimethylbutane	0.00	0.00
2-Methylpentane	0.00	0.00
3-Methylpentane	0.00	0.00
Hexane	0.00	0.00
2,2-Dimethylpentane	0.00	0.00
Methylcyclopentane	0.00	0.00
Benzene	0.00	0.00
Cyclohexane	0.00	0.00
2-Methylhexane	0.00	0.00
2,3-Dimethylpentane	3.59E-06	7.80E-09
3-Methylhexane	8.49E-06	1.25E-08
1,1-3-Dimethylcyclohexane	1.73E-10	1.15E-17
Heptane	7.62E-06	1.25E-08
Methylcyclohexane	4.26E-05	3.60E-07
2,3-Dimethylhexane	1.80E-06	4.78E-09
Toluene	1.50E-04	8.00E-05
2-Methylheptane	5.10E-07	1.88E-10
4-Methylheptane	1.05E-06	1.41E-09
3-Methylheptane	8.34E-07	1.20E-09
Octane	8.91E-07	7.92E-10
m-Xylene	3.07E-05	1.61E-05
Nonane	1.12E-07	1.65E-10

Emissions to Atmosphere		
Component	tons/year	mass fraction
Water	0.01	100.00
TEG	0.00	0.00
Nitrogen	0.00	0.00
Methane	0.47	0.00
CO2	0.02	0.00
Ethane	0.12	0.00
Propane	0.03	0.00
i-Butane	0.00	0.00
n-Butane	0.01	0.00
i-Pentane	0.00	0.00
n-Pentane	0.00	0.00
2,2-Dimethylbutane	0.00	0.00
2,3-Dimethylbutane	0.00	0.00
2-Methylpentane	0.00	0.00
3-Methylpentane	0.00	0.00
Hexane	0.00	0.00
2,2-Dimethylpentane	0.00	0.00
Methylcyclopentane	0.00	0.00
Benzene	0.00	0.00
Cyclohexane	0.00	0.00
2-Methylhexane	0.00	0.00
2,3-Dimethylpentane	3.59E-06	7.80E-09
3-Methylhexane	8.49E-06	1.25E-08
1,1-3-Dimethylcyclohexane	1.73E-10	1.15E-17
Heptane	7.62E-06	1.25E-08
Methylcyclohexane	4.26E-05	3.60E-07
2,3-Dimethylhexane	1.80E-06	4.78E-09
Toluene	1.50E-04	8.00E-05
2-Methylheptane	5.10E-07	1.88E-10
4-Methylheptane	1.05E-06	1.41E-09
3-Methylheptane	8.34E-07	1.20E-09
Octane	8.91E-07	7.92E-10
m-Xylene	3.07E-05	1.61E-05
Nonane	1.12E-07	1.65E-10

Emissions to Atmosphere		
Component	tons/year	mass fraction
Water	0.01	100.00
TEG	0.00	0.00
Nitrogen	0.00	0.00
Methane	0.47	0.00
CO2	0.02	0.00
Ethane	0.12	0.00
Propane	0.03	0.00
i-Butane	0.00	0.00
n-Butane	0.01	0.00
i-Pentane	0.00	0.00
n-Pentane	0.00	0.00
2,2-Dimethylbutane	0.00	0.00
2,3-Dimethylbutane	0.00	0.00
2-Methylpentane	0.00	0.00
3-Methylpentane	0.00	0.00
Hexane	0.00	0.00
2,2-Dimethylpentane	0.00	0.00
Methylcyclopentane	0.00	0.00
Benzene	0.00	0.00
Cyclohexane	0.00	0.00
2-Methylhexane	0.00	0.00
2,3-Dimethylpentane	3.59E-06	7.80E-09
3-Methylhexane	8.49E-06	1.25E-08
1,1-3-Dimethylcyclohexane	1.73E-10	1.15E-17
Heptane	7.62E-06	1.25E-08
Methylcyclohexane	4.26E-05	3.60E-07
2,3-Dimethylhexane	1.80E-06	4.78E-09
Toluene	1.50E-04	8.00E-05
2-Methylheptane	5.10E-07	1.88E-10
4-Methylheptane	1.05E-06	1.41E-09
3-Methylheptane	8.34E-07	1.20E-09
Octane	8.91E-07	7.92E-10
m-Xylene	3.07E-05	1.61E-05
Nonane	1.12E-07	1.65E-10

Produced Liquids		
Component	mass fraction	Std Liquid Volumetric Flow
Water	100.00	63
TEG	0.00	0
Nitrogen	0.00	0
Methane	0.00	0
CO2	0.00	0
Ethane	0.00	0
Propane	0.00	0
i-Butane	0.00	0
n-Butane	0.00	0
i-Pentane	0.00	0
n-Pentane	0.00	0
2,2-Dimethylbutane	0.00	0
2,3-Dimethylbutane	0.00	0
2-Methylpentane	0.00	0
3-Methylpentane	0.00	0
Hexane	0.00	0
2,2-Dimethylpentane	0.00	0
Methylcyclopentane	0.00	0
Benzene	0.00	0
Cyclohexane	0.00	0
2-Methylhexane	0.00	0
2,3-Dimethylpentane	7.80E-09	6.9676
3-Methylhexane	1.25E-08	
1,1-3-Dimethylcyclohexane	1.15E-17	
Heptane	1.25E-08	
Methylcyclohexane	3.60E-07	
2,3-Dimethylhexane	4.78E-09	
Toluene	8.00E-05	
2-Methylheptane	1.88E-10	
4-Methylheptane	1.41E-09	
3-Methylheptane	1.20E-09	
Octane	7.92E-10	
m-Xylene	1.61E-05	
Nonane	1.65E-10	

ATTACHMENT O

Monitoring/Recordkeeping/Reporting/Testing Plans

"31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as Attachment O."

- **Monitoring/Recordkeeping/Reporting/Testing Plans**
 - A. Monitoring
 - B. Recordkeeping
 - C. Reporting
 - D. Testing
-

Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
Application for 45CSR13 NSR Modification Permit

Attachment O
MONITORING/RECORDKEEPING/REPORTING/TESTING PLANS

Williams Ohio Valley Midstream LLC proposes the following monitoring, recordkeeping, testing and reporting requirements at the subject facility:

A. Monitoring

1. Monitor and record quantity of natural gas combusted in the engine.
2. Monitor and record quantity of natural gas treated in the dehydrator.
3. Monitor and record quantity of produced water transferred from the storage tanks.
4. Use data collected above as input into GRI-GLYCalc Model to determine actual and potential VOC and HAP emissions on yearly basis.

B. Recordkeeping

1. Maintain records of the amount of natural gas consumed and hours of operation for the engine.
2. Maintain records of the amount of natural gas treated in the dehydrator.
3. Maintain records demonstrating the actual annual average volume of natural gas treated in the dehydrator is less than 3 MMscfd OR the actual annual average benzene emissions are less than one ton per year.
4. Maintain records of the amount of produced water transferred from the storage tanks.
5. Maintain records of testing conducted in accordance with the permit. Said records will be maintained on-site or in a readily accessible off-site location.
6. Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engine, dehydration unit and ancillary equipment.
7. The records shall be maintained on site or in a readily available off-site location for a period of five (5) years.

C. Reporting

1. Any deviations from the allowable emissions limitations, including visible emissions.
2. Any and all application forms, reports, or compliance certifications required by this Permit shall be certified by a responsible official.

D. Testing

Not Applicable (except for annual extended gas analysis described above).

ATTACHMENT P

Public Notice

"32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and Example Legal Advertisement for details). Please submit the **Affidavit of Publication** as Attachment P immediately upon receipt."

The applicant shall cause such legal advertisement to appear a minimum of one (1) day in the newspaper most commonly read in the area where the facility exists or will be constructed. The notice must be published no earlier than five (5) working days of receipt by this office of your application. The original affidavit of publication must be received by this office no later than the last day of the public comment period.

Types and amounts of pollutants discharged must include all regulated pollutants (PM, PM10, VOC, SO₂, Xylene, etc.) and their potential to emit or the permit level being sought in units of tons per year (including fugitive emissions).

- Legal Advertisement (as shown) will be placed in a newspaper of general circulation in the area where the source is located (See 45CSR§13-8.3 thru 45CSR§13-8.5).
 - An Affidavit of Publication shall be submitted immediately upon receipt.
-

Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
Application for 45CSR13 NSR Modification Permit
Attachment P
Public Notice

AIR QUALITY PUBLIC NOTICE
Notice of Application

Notice is given that Williams Ohio Valley Midstream LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a 45CSR13 New Source Review (NSR) Modification Permit for the existing Taylor Compressor Station; located ~1.0 Miles South of Fork Ridge Rd, ~5.0 Miles Southeast of Moundsville, in Marshall County, West Virginia.

The latitude and longitude coordinates are 39.8583 degrees North and -80.6891 degrees West.

The applicant estimates the increase/(decrease) in the potential to discharge the following regulated air pollutants will be:

0.00 tons of nitrogen oxides per year
0.00 tons of carbon monoxide per year
23.55 tons of volatile organic compounds per year
0.00 tons of sulfur dioxide per year
0.00 tons of particulate matter per year
0.77 tons of benzene per year
0.49 tons of ethylbenzene per year
0.01 tons of formaldehyde per year
1.72 tons of n-hexane per year
1.60 tons of toluene per year
0.17 tons of 2,2,4-trimethylpentane per year
0.99 tons of xylenes per year
0.08 tons of other hazardous air pollutants per year
5.66 tons of total hazardous air pollutants per year
824 tons of carbon dioxide equivalent per year

Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated this the _____ day of _____ 2015.

By: Mr. Don Wicburg, Vice President and General Manager
Williams Ohio Valley Midstream LLC
100 Teletech Drive, Suite 2
Moundsville, WV 26041

ATTACHMENT Q
Business Confidential Claims
(NOT APPLICABLE)

also

ATTACHMENT R
Authority Forms
(NOT APPLICABLE)

also

ATTACHMENT S
Title V Permit Revision Information
(NOT APPLICABLE)

ATTACHMENT T
Current Permit

Permit Type: **Permit to Construct**
Permit No: **R13-3109A**
Issued to: **Williams Ohio Valley Midstream**
Site Name: **Taylor Station**
Address: **~1.0 Miles South of Fork Ridge Rd**
~5.0 Miles Southeast of Moundsville
Location: **Moundsville, Marshall Co, WV**
Lat x Lon: **39.8583° North x -80.6891° West**
UTM: **526.594 km Easting x 4,412.077 km Northing x Zone 17**
Sources: **One (1) 203 bhp Caterpillar G3306TA Compressor Engine**
One (1) 5.0 MMscfd TEG Dehydrator
One (1) 0.20 MMBtu/hr Reboiler
Two (2) 210 bbl Produced Water Storage Tanks
Produced Water Truck Load-Out
Issued: **03/10/14**
Expires: **na**

oOo

**Proposed modifications to the current permit
are provided in a redline/~~strike-through~~ format**

1.0. Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
Point Sources					
CE-1	1E	Caterpillar G3306TA Engine	2013	203 bhp	NSCR
RSV-1	3E	Glycol Dehydrator Still Vent	2013	5.0 MMscfd	None
	2E	TEG Dehydrator Flash Tank and Still Vent		7.0 MMscfd	
RBV-1	2E	Glycol Dehydrator Reboiler	2013	0.20 MMBtu/hr	None
	3E	TEG Dehydrator Reboiler		0.22 MMBtu/hr	
T01	4E	Produced Water Storage Tank	2013	210 bbl	None
T02	5E	Produced Water Storage Tank	2013 TBD	210 bbl	None
TLO	6E	Truck Load-Out Produced Water	2013	211,680 gal/yr	None

2.0. General Conditions ... No Change

3.0. Facility-Wide Requirements ... No Change

4.0. Source-Specific Requirements ... No Change

5.0. Source-Specific Requirements (Engine, CE-1)

5.1. Limitations and Standards

- 5.1.1. No Change
- 5.1.2. No Change
- 5.1.3. No Change
- 5.1.4. No Change
- 5.1.5. No Change

5.1. Recordkeeping Requirements ... No Change

6.0. Source-Specific Requirements (Reboiler, 2E 3E)

6.1. Limitations and Standards

- 6.1.1. Maximum Design Heat Input. The maximum design heat input for the Reboiler (~~2E~~ 3E) shall not exceed ~~0.20~~ 0.22 MMBtu/hr.
- 6.2.2. The quantity of natural gas that shall be consumed in the ~~0.20~~ 0.22 MMBtu/hr reboiler (~~2E~~ 3E) shall not exceed ~~250~~ 217 cubic feet per hour and ~~2.2~~ 1.9×10^6 cubic feet per year.

6.2. Monitoring Requirements ... Change references from 2E to 3E

6.3. Testing Requirements ... No Change

6.4. Recordkeeping Requirements ... Change references from 2E to 3E

6.5. Reporting Requirements ... No Change

7.0. Source-Specific Requirements (~~Natural Gas Dehydration Unit, 3E~~ TEG Dehydrator, 2E)

7.1. Limitations and Standards

- 7.1.1. Maximum Throughput Limitation. The maximum wet natural gas throughput to the glycol dehydration unit/still column shall not exceed ~~5.0~~ 7.0 million standard cubic feet per day (MMscfd)
- 7.1.2. Maximum emissions from the glycol dehydration unit/still column (~~3E~~ 2E) shall not exceed the following limits:

Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (ton/yr)
Volatile Organic Compounds	9.24	40.49
	12.40	54.29
n-Hexane	0.18	0.77
	0.46	2.00
Benzene	0.05	0.21
	0.21	0.91
Toluene	0.10	0.46
	0.44	1.92
Ethylbenzene	0.01	0.05
	0.09	0.41
Xylenes	0.09	0.39
	0.30	1.32

- 7.1.3. ... No Change
- 7.1.4. ... Change references from 2E to 3E
- 7.1.5. ... No Change
- 7.1.6. ... No Change

- 7.2. Monitoring Requirements ... Change references from 3E to 2E
- 7.3. Testing Requirements ... No Change
- 7.4. Recordkeeping Requirements ... Change references from 3E to 2E

8.0. Source-Specific Requirements (Truck Loading; 6E)

- 8.1. Limitations and Standards ... No Change
- 8.2. Recordkeeping Requirements ... No Change

9.0. Source-Specific Requirements (Storage Tanks; 4E, 5E)

- 9.1. Limitations and Standards ... No Change
- 9.2. Recordkeeping Requirements ... No Change

10.0. Source-Specific Requirements (40CFR60 Subpart JJJJ Requirements, 1E) ... No Change

11.0. Source-Specific Requirements (40CFR63 Subpart ZZZZ Requirements, 1E) ... No Change

This permit will supersede and replace Permit R13-3109.

Facility Location: Moundsville, Marshall County, West Virginia
Mailing Address: Park Place Corporate Center 2, 2000 Commerce Drive, Pittsburgh, PA 15275
Facility Description: Natural gas compressor and TEG dehydration station
NAICS Codes: 213112
UTM Coordinates: 526.594 km Easting • 4,412.077 km Northing • Zone 17
Permit Type: Class II Administrative Update
Description of Change: Reciprocating compressor associated with engine E1 is subject to 40CFR60 subpart OOOO.

Any person whose interest may be affected, including, but not necessarily limited to, the applicant and any person who participated in the public comment process, by a permit issued, modified or denied by the Secretary may appeal such action of the Secretary to the Air Quality Board pursuant to article one [§§22B-1-1 et seq.], Chapter 22B of the Code of West Virginia. West Virginia Code §§22-5-14.

The source is not subject to 45CSR30.

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1.0. Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
CE-01	1E	Caterpillar G3306TA Engine	2013	203 bhp	NSCR
RBV-1	2E	Glycol Dehydrator Reboiler	2013	0.20 MMBTU/hr	None
RSV-1	3E	Glycol Dehydrator Still Vent	2013	5.0 mmscfd	None
T01	4E	Produced Water Storage Tank	2013	210 bbl	None
T02	5E	Produced Water Storage Tank	2013	210 bbl	None
TLO	6E	Truck Loadout	2013	211,680 gallons/year	None

1.1. Control Devices

Emission Unit	Pollutant	Control Device	Control Efficiency
CE-01	Nitrogen Oxides	NSCR	88 %
	Carbon Monoxide		76 %

2.0. General Conditions

2.1. Definitions

- 2.1.1. All references to the "West Virginia Air Pollution Control Act" or the "Air Pollution Control Act" mean those provisions contained in W.Va. Code §§ 22-5-1 to 22-5-18.
- 2.1.2. The "Clean Air Act" means those provisions contained in 42 U.S.C. §§ 7401 to 7671q, and regulations promulgated thereunder.
- 2.1.3. "Secretary" means the Secretary of the Department of Environmental Protection or such other person to whom the Secretary has delegated authority or duties pursuant to W.Va. Code §§ 22-1-6 or 22-1-8 (45CSR§30-2.12.). The Director of the Division of Air Quality is the Secretary's designated representative for the purposes of this permit.

2.2. Acronyms

CAAA	Clean Air Act Amendments	NO _x	Nitrogen Oxides
CBI	Confidential Business Information	NSPS	New Source Performance Standards
CEM	Continuous Emission Monitor	PM	Particulate Matter
CES	Certified Emission Statement	PM _{2.5}	Particulate Matter less than 2.5 µm in diameter
C.F.R. or CFR	Code of Federal Regulations	PM ₁₀	Particulate Matter less than 10µm in diameter
CO	Carbon Monoxide	Ppb	Pounds per Batch
C.S.R. or CSR	Codes of State Rules	Pph	Pounds per Hour
DAQ	Division of Air Quality	Ppm	Parts per Million
DEP	Department of Environmental Protection	Ppm _v or ppmv	Parts per Million by Volume
dscm	Dry Standard Cubic Meter	PSD	Prevention of Significant Deterioration
FOIA	Freedom of Information Act	Psi	Pounds per Square Inch
HAP	Hazardous Air Pollutant	SIC	Standard Industrial Classification
HON	Hazardous Organic NESHAP	SIP	State Implementation Plan
HP	Horsepower	SO ₂	Sulfur Dioxide
lbs/hr	Pounds per Hour	TAP	Toxic Air Pollutant
LDAR	Leak Detection and Repair	TPY	Tons per Year
M	Thousand	TRS	Total Reduced Sulfur
MACT	Maximum Achievable Control Technology	TSP	Total Suspended Particulate
MDHI	Maximum Design Heat Input	USEPA	United States Environmental Protection Agency
MM	Million	UTM	Universal Transverse Mercator
MMBtu/hr or mmbtu/hr	Million British Thermal Units per Hour	VEE	Visual Emissions Evaluation
MMCF/hr or mmcf/hr	Million Cubic Feet per Hour	VOC	Volatile Organic Compounds
NA	Not Applicable	VOL	Volatile Organic Liquids
NAAQS	National Ambient Air Quality Standards		
NESHAPS	National Emissions Standards for Hazardous Air Pollutants		

2.3. Authority

This permit is issued in accordance with West Virginia air pollution control law W.Va. Code §§ 22-5-1. et seq. and the following Legislative Rules promulgated thereunder:

- 2.3.1. 45CSR13 – *Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits and Procedures for Evaluation;*

2.4. Term and Renewal

- 2.4.1. This Permit shall remain valid, continuous and in effect unless it is revised, suspended, revoked or otherwise changed under an applicable provision of 45CSR13 or any other applicable legislative rule;

2.5. Duty to Comply

- 2.5.1. The permitted facility shall be constructed and operated in accordance with the plans and specifications filed in Permit Applications R13-3109 and any modifications, administrative updates, or amendments thereto. The Secretary may suspend or revoke a permit if the plans and specifications upon which the approval was based are not adhered to; [45CSR§§13-5.11 and -10.3.]
- 2.5.2. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the West Virginia Code and the Clean Air Act and is grounds for enforcement action by the Secretary or USEPA;
- 2.5.3. Violations of any of the conditions contained in this permit, or incorporated herein by reference, may subject the permittee to civil and/or criminal penalties for each violation and further action or remedies as provided by West Virginia Code 22-5-6 and 22-5-7;
- 2.5.4. Approval of this permit does not relieve the permittee herein of the responsibility to apply for and obtain all other permits, licenses, and/or approvals from other agencies; i.e., local, state, and federal, which may have jurisdiction over the construction and/or operation of the source(s) and/or facility herein permitted.

2.6. Duty to Provide Information

The permittee shall furnish to the Secretary within a reasonable time any information the Secretary may request in writing to determine whether cause exists for administratively updating, modifying, revoking, or terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the Secretary copies of records to be kept by the permittee. For information claimed to be confidential, the permittee shall furnish such records to the Secretary along with a claim of confidentiality in accordance with 45CSR31. If confidential information is to be sent to USEPA, the permittee shall directly provide such information to USEPA along with a claim of confidentiality in accordance with 40 C.F.R. Part 2.

2.7. Duty to Supplement and Correct Information

Upon becoming aware of a failure to submit any relevant facts or a submittal of incorrect information in any permit application, the permittee shall promptly submit to the Secretary such supplemental facts or corrected information.

2.8. Administrative Update

The permittee may request an administrative update to this permit as defined in and according to the procedures specified in 45CSR13.
[45CSR§13-4.]

2.9. Permit Modification

The permittee may request a minor modification to this permit as defined in and according to the procedures specified in 45CSR13.
[45CSR§13-5.4.]

2.10 Major Permit Modification

The permittee may request a major modification as defined in and according to the procedures specified in 45CSR14 or 45CSR19, as appropriate.
[45CSR§13-5.1]

2.11. Inspection and Entry

The permittee shall allow any authorized representative of the Secretary, upon the presentation of credentials and other documents as may be required by law, to perform the following:

- a. At all reasonable times (including all times in which the facility is in operation) enter upon the permittee's premises where a source is located or emissions related activity is conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times (including all times in which the facility is in operation) any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit;
- d. Sample or monitor at reasonable times substances or parameters to determine compliance with the permit or applicable requirements or ascertain the amounts and types of air pollutants discharged.

2.12. Emergency

- 2.12.1. An "emergency" means any situation arising from sudden and reasonable unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by

improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

- 2.12.2. Effect of any emergency. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if the conditions of Section 2.12.3 are met.
- 2.12.3. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:
- a. An emergency occurred and that the permittee can identify the cause(s) of the emergency;
 - b. The permitted facility was at the time being properly operated;
 - c. During the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in the permit; and
 - d. The permittee submitted notice of the emergency to the Secretary within one (1) working day of the time when emission limitations were exceeded due to the emergency and made a request for variance, and as applicable rules provide. This notice must contain a detailed description of the emergency, any steps taken to mitigate emissions, and corrective actions taken.
- 2.12.4. In any enforcement proceeding, the permittee seeking to establish the occurrence of an emergency has the burden of proof.
- 2.12.5 The provisions of this section are in addition to any emergency or upset provision contained in any applicable requirement.

2.13. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it should have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. However, nothing in this paragraph shall be construed as precluding consideration of a need to halt or reduce activity as a mitigating factor in determining penalties for noncompliance if the health, safety, or environmental impacts of halting or reducing operations would be more serious than the impacts of continued operations.

2.14. Suspension of Activities

In the event the permittee should deem it necessary to suspend, for a period in excess of sixty (60) consecutive calendar days, the operations authorized by this permit, the permittee shall notify the Secretary, in writing, within two (2) calendar weeks of the passing of the sixtieth (60) day of the suspension period.

2.15. Property Rights

This permit does not convey any property rights of any sort or any exclusive privilege.

2.16. Severability

The provisions of this permit are severable and should any provision(s) be declared by a court of competent jurisdiction to be invalid or unenforceable, all other provisions shall remain in full force and effect.

2.17. Transferability

This permit is transferable in accordance with the requirements outlined in Section 10.1 of 45CSR13, [45CSR§13-10.1.]

2.18. Notification Requirements

The permittee shall notify the Secretary, in writing, no later than thirty (30) calendar days after the actual startup of the operations authorized under this permit.

2.19. Credible Evidence

Nothing in this permit shall alter or affect the ability of any person to establish compliance with, or a violation of, any applicable requirement through the use of credible evidence to the extent authorized by law. Nothing in this permit shall be construed to waive any defense otherwise available to the permittee including, but not limited to, any challenge to the credible evidence rule in the context of any future proceeding.

3.0. Facility-Wide Requirements

3.1. Limitations and Standards

- 3.1.1. **Open burning.** The open burning of refuse by any person, firm, corporation, association or public agency is prohibited except as noted in 45CSR§6-3.1.
[45CSR§6-3.1.]
- 3.1.2. **Open burning exemptions.** The exemptions listed in 45CSR§6-3.1 are subject to the following stipulation: Upon notification by the Secretary, no person shall cause, suffer, allow or permit any form of open burning during existing or predicted periods of atmospheric stagnation. Notification shall be made by such means as the Secretary may deem necessary and feasible.
[45CSR§6-3.2.]
- 3.1.3. **Asbestos.** The permittee is responsible for thoroughly inspecting the facility, or part of the facility, prior to commencement of demolition or renovation for the presence of asbestos and complying with 40 C.F.R. § 61.145, 40 C.F.R. § 61.148, and 40 C.F.R. § 61.150. The permittee, owner, or operator must notify the Secretary at least ten (10) working days prior to the commencement of any asbestos removal on the forms prescribed by the Secretary if the permittee is subject to the notification requirements of 40 C.F.R. § 61.145(b)(3)(i). The USEPA, the Division of Waste Management, and the Bureau for Public Health - Environmental Health require a copy of this notice to be sent to them.
[40CFR§61.145(b) and 45CSR§34]
- 3.1.4. **Odor.** No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.
[45CSR§4-3.1] *[State Enforceable Only]*
- 3.1.5. **Permanent shutdown.** A source which has not operated at least 500 hours in one 12-month period within the previous five (5) year time period may be considered permanently shutdown, unless such source can provide to the Secretary, with reasonable specificity, information to the contrary. All permits may be modified or revoked and/or reapplication or application for new permits may be required for any source determined to be permanently shutdown.
[45CSR§13-10.5.]
- 3.1.6. **Standby plan for reducing emissions.** When requested by the Secretary, the permittee shall prepare standby plans for reducing the emissions of air pollutants in accordance with the objectives set forth in Tables I, II, and III of 45CSR11.
[45CSR§11-5.2.]

3.2. Monitoring Requirements

[Reserved]

3.3. Testing Requirements

- 3.3.1. **Stack testing.** As per provisions set forth in this permit or as otherwise required by the Secretary, in accordance with the West Virginia Code, underlying regulations, permits and orders, the permittee shall conduct test(s) to determine compliance with the emission limitations set forth in this permit and/or established or set forth in underlying documents. The Secretary, or his duly authorized representative, may at his option witness or conduct such test(s). Should the Secretary exercise his option to conduct such test(s), the operator shall provide all necessary sampling

connections and sampling ports to be located in such manner as the Secretary may require, power for test equipment and the required safety equipment, such as scaffolding, railings and ladders, to comply with generally accepted good safety practices. Such tests shall be conducted in accordance with the methods and procedures set forth in this permit or as otherwise approved or specified by the Secretary in accordance with the following:

- a. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with 40 C.F.R. Parts 60, 61, and 63 in accordance with the Secretary's delegated authority and any established equivalency determination methods which are applicable. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4. or 45CSR§13-5.4 as applicable.
- b. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with applicable requirements which do not involve federal delegation. In specifying or approving such alternative testing to the test methods, the Secretary, to the extent possible, shall utilize the same equivalency criteria as would be used in approving such changes under Section 3.3.1.a. of this permit. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4. or 45CSR§13-5.4 as applicable.
- d. The permittee shall submit a report of the results of the stack test within sixty (60) days of completion of the test. The test report shall provide the information necessary to document the objectives of the test and to determine whether proper procedures were used to accomplish these objectives. The report shall include the following: the certification described in paragraph 3.5.1.; a statement of compliance status, also signed by a responsible official; and, a summary of conditions which form the basis for the compliance status evaluation. The summary of conditions shall include the following:
 1. The permit or rule evaluated, with the citation number and language;
 2. The result of the test for each permit or rule condition; and,
 3. A statement of compliance or noncompliance with each permit or rule condition.

[WV Code § 22-5-4(a)(14-15) and 45CSR13]

3.4. Recordkeeping Requirements

- 3.4.1. **Retention of records.** The permittee shall maintain records of all information (including monitoring data, support information, reports, and notifications) required by this permit recorded in a form suitable and readily available for expeditious inspection and review. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation. The files shall be maintained for at least five (5) years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent two (2) years of data shall be maintained on site. The remaining three (3) years of data may be maintained off site, but must remain accessible within a reasonable time. Where appropriate, the permittee may maintain records electronically (on a computer, on computer floppy disks, CDs, DVDs, or magnetic tape disks), on microfilm, or on microfiche.

- 3.4.2. **Odors.** For the purposes of 45CSR4, the permittee shall maintain a record of all odor complaints received, any investigation performed in response to such a complaint, and any responsive action(s) taken.
[45CSR§4. *State Enforceable Only.*]

3.5. Reporting Requirements

- 3.5.1. **Responsible official.** Any application form, report, or compliance certification required by this permit to be submitted to the DAQ and/or USEPA shall contain a certification by the responsible official that states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.
- 3.5.2. **Confidential information.** A permittee may request confidential treatment for the submission of reporting required by this permit pursuant to the limitations and procedures of W.Va. Code § 22-5-10 and 45CSR31.
- 3.5.3. **Correspondence.** All notices, requests, demands, submissions and other communications required or permitted to be made to the Secretary of DEP and/or USEPA shall be made in writing and shall be deemed to have been duly given when delivered by hand, or mailed first class with postage prepaid to the address(es) set forth below or to such other person or address as the Secretary of the Department of Environmental Protection may designate:

If to the DAQ:
Director
WVDEP
Division of Air Quality
601 57th Street
Charleston, WV 25304-2345

If to the US EPA:
Associate Director
Office of Air Enforcement and Compliance
Assistance
(3AP20)
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

3.5.4. Operating Fee

- 3.5.4.1. In accordance with 45CSR22 – Air Quality Management Fee Program, the permittee shall not operate nor cause to operate the permitted facility or other associated facilities on the same or contiguous sites comprising the plant without first obtaining and having in current effect a Certificate to Operate (CTO). Such Certificate to Operate (CTO) shall be renewed annually, shall be maintained on the premises for which the certificate has been issued, and shall be made immediately available for inspection by the Secretary or his/her duly authorized representative.
- 3.5.5. **Emission inventory.** At such time(s) as the Secretary may designate, the permittee herein shall prepare and submit an emission inventory for the previous year, addressing the emissions from the facility and/or process(es) authorized herein, in accordance with the emission inventory submittal requirements of the Division of Air Quality. After the initial submittal, the Secretary may, based upon the type and quantity of the pollutants emitted, establish a frequency other than on an annual basis.

4.0. Source-Specific Requirements

4.1. Limitations and Standards

4.1.1. **Record of Monitoring.** The permittee shall keep records of monitoring information that include the following:

- a. The date, place as defined in this permit, and time of sampling or measurements;
- b. The date(s) analyses were performed;
- c. The company or entity that performed the analyses;
- d. The analytical techniques or methods used;
- e. The results of the analyses; and
- f. The operating conditions existing at the time of sampling or measurement.

4.1.2. **Minor Source of Hazardous Air Pollutants (HAP).** HAP emissions from the facility shall be less than 10 tons/year of any single HAP or 25 tons/year of any combination of HAPs. Compliance with this Section shall ensure that the facility is a minor HAP source.

4.1.3. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

4.1.4. **Record of Malfunctions of Air Pollution Control Equipment.** For all air pollution control equipment listed in Section 1.0, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:

- a. The equipment involved.
- b. Steps taken to minimize emissions during the event.
- c. The duration of the event.
- d. The estimated increase in emissions during the event.

For each such case associated with an equipment malfunction, the additional information shall also be recorded:

- e. The cause of the malfunction.
- f. Steps taken to correct the malfunction.
- g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.

5.0. Source-Specific Requirements (Engine, 1E)

5.1. Limitations and Standards

- 5.1.1. The quantity of natural gas that shall be consumed in the 203 hp natural gas fired reciprocating engine equipped with NSCR, Caterpillar 3306TA (1E) shall not exceed 1,816 cubic feet per hour or 15.91×10^6 cubic feet per year.
- 5.1.2. Maximum emissions from the 203 hp natural gas fired reciprocating engine equipped with NSCR, Caterpillar 3306TA (1E) shall not exceed the following limits:

Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (ton/year)
Nitrogen Oxides	0.89	3.90
Carbon Monoxide	1.78	7.80
Volatile Organic Compounds	0.28	1.22
Formaldehyde	0.11	0.49

5.1.3. Requirements for Use of Catalytic Reduction Devices

- a. Rich-burn natural gas compressor engines equipped with non-selective catalytic reduction (NSCR) air pollution control devices shall be fitted with a closed-loop, automatic air/fuel ratio controller to ensure emissions of regulated pollutants do not exceed the potential to emit for any engine/NSCR combination under varying load. The closed-loop, automatic air/fuel ratio controller shall control a fuel metering valve to deliver additional fuel when required to ensure a fuel-rich mixture and a resultant exhaust oxygen content of less than or equal to 0.5%. The automatic air/fuel ratio controller shall also incorporate dual-point exhaust gas temperature and oxygen sensors which provide temperature and exhaust oxygen content differential feedback. Such controls shall ensure proper and efficient operation of the engine and NSCR air pollution control device;
- b. The automatic air/fuel ratio controller or closed-loop automatic feedback controller shall provide a warning or indication to the operator and/or be interlocked with the engine ignition system to cease engine operation in case of a masking, poisoning or overrich air/fuel ratio situation which results in performance degradation or failure of the catalyst element; and
- c. No person shall knowingly:
1. Remove or render inoperative any air pollution or auxiliary air pollution control device installed subject to the requirements of this permit;
 2. Install any part or component when the principal effect of the part or component is to bypass, defeat or render inoperative any air pollution control device or auxiliary air pollution control device installed subject to the requirements of this permit; or
 3. Cause or allow engine exhaust gases to bypass any catalytic reduction device.

5.2. Monitoring Requirements

5.2.1. Catalytic Oxidizer Control Devices

- a. The permittee shall regularly inspect, properly maintain and/or replace catalytic reduction devices and auxiliary air pollution control devices to ensure functional and effective operation of the engine's physical and operational design. The permittee shall ensure proper operation, maintenance and performance of catalytic reduction devices and auxiliary air pollution control devices by:
 1. Maintaining proper operation of the automatic air/fuel ratio controller or automatic feedback controller.
 2. Following operating and maintenance recommendations of the catalyst element manufacturer.

5.3. Testing Requirements

- 5.3.1. See Facility-Wide Testing Requirements Section 3.3.

5.4. Recordkeeping Requirements

- 5.4.1. To demonstrate compliance with sections 5.1.1 – 5.1.2, the permittee shall maintain records of the amount of natural gas consumed and the hours of operation of the engine. Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.
- 5.4.2. To demonstrate compliance with section 5.1.3 the permittee shall maintain records of all catalytic reduction device maintenance. Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

5.5. Reporting Requirements

- 5.5.1. See Facility-Wide Reporting Requirements Section 3.5.

6.0. Source-Specific Requirements (Reboiler, 2E)

6.1. Limitations and Standards

- 6.1.1. Maximum Design Heat Input. The maximum design heat input for the Reboiler (2E) shall not exceed 0.20 MMBTU/hr.
- 6.1.2. The quantity of natural gas that shall be consumed in the 0.20 MMBTU/hr Reboiler (2E) shall not exceed 250 cubic feet per hour and 2.2×10^6 cubic feet per year.
- 6.1.3. No person shall cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from any fuel burning unit which is greater than ten (10) percent opacity based on a six minute block average.
[45CSR§2-3.1.]

6.2. Monitoring Requirements

- 6.2.1. For the purpose of determining compliance with the opacity limits of 45CSR2, the permittee shall conduct visible emission checks and/or opacity monitoring and recordkeeping for the Reboiler (2E).

The visible emission check shall determine the presence or absence of visible emissions. At a minimum, the observer must be trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor) on the visibility of emissions. This training may be obtained from written materials found in the References 1 and 2 from 40CFR Part 60, Appendix A, Method 22 or from the lecture portion of the 40CFR Part 60, Appendix A, Method 9 certification course.

Visible emission checks shall be conducted at least once per calendar month with a maximum of forty-five (45) days between consecutive readings. These checks shall be performed at each source for a sufficient time interval, but no less than one (1) minute, to determine if any visible emissions are present. Visible emission checks shall be performed during periods of facility operation and appropriate weather conditions.

If visible emissions are present at a source(s) for three (3) consecutive monthly checks, the permittee shall conduct an opacity reading at that source(s) using the procedures and requirements of Method 9 as soon as practicable, but within seventy-two (72) hours of the final visual emission check. A Method 9 observation at a source(s) restarts the count of the number of consecutive readings with the presence of visible emissions.

6.3. Testing Requirements

- 6.3.1. Compliance with the visible emission requirements of section 6.1.3 shall be determined in accordance with 40 CFR Part 60, Appendix A, Method 9, Method 22, or by using measurements from continuous opacity monitoring systems approved by the Director. The Director may require the installation, calibration, maintenance and operation of continuous opacity monitoring systems and may establish policies for the evaluation of continuous opacity monitoring results and the determination of compliance with the visible emission requirements of section 6.1.3. Continuous opacity monitors shall not be required on fuel burning units which employ wet scrubbing systems for emission control.

6.4. Recordkeeping Requirements

- 6.4.1. To demonstrate compliance with section 6.1.2, the permittee shall maintain records of the amount of natural gas consumed in the Reboiler (2E). Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.
- 6.4.2. The permittee shall maintain records of all monitoring data required by Section 6.2.1 documenting the date and time of each visible emission check, the emission point or equipment/source identification number, the name or means of identification of the observer, the results of the check(s), whether the visible emissions are normal for the process, and, if applicable, all corrective measures taken or planned. The permittee shall also record the general weather conditions (i.e. sunny, approximately 80°F, 6 - 10 mph NE wind) during the visual emission check(s). Should a visible emission observation be required to be performed per the requirements specified in Method 9, the data records of each observation shall be maintained per the requirements of Method 9.

6.5. Reporting Requirements

- 6.5.1. Any deviation(s) from the allowable visible emission requirement for any emission source discovered during observations using 40CFR Part 60, Appendix A, Method 9 or 22 shall be reported in writing to the Director of the Division of Air Quality as soon as practicable, but in any case within ten (10) calendar days of the occurrence and shall include at least the following information: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any corrective measures taken or planned.

7.0. Source-Specific Hazardous Air Pollutant Requirements (Natural Gas Dehydration Unit, 3E)

7.1. Limitations and Standards

7.1.1. **Maximum Throughput Limitation.** The maximum wet natural gas throughput to the glycol dehydration unit/still column shall not exceed 5.0 million standard cubic feet per day (mmscfd). Compliance with the Maximum Throughput Limitation shall be determined using a twelve month rolling total. A twelve month rolling total shall mean the sum of the monthly throughput at any given time during the previous twelve consecutive calendar months.

7.1.2. Maximum emissions from the glycol dehydration unit/still column (3E) shall not exceed the following limits:

Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (ton/year)
Volatile Organic Compounds	9.24	40.49
n-Hexane	0.18	0.77
Benzene	0.05	0.21
Toluene	0.10	0.46
Ethylbenzene	0.01	0.05
Xylenes	0.09	0.39

7.1.3. For purposes of determining potential HAP emissions at production-related facilities, the methods specified in 40 CFR 63, Subpart HH (i.e. excluding compressor engines from HAP PTE) shall be used.

7.1.4. The glycol dehydration reboiler (2E) shall be designed and operated in accordance with the following:

- a. The still vent vapors shall be routed to the atmosphere and 50% of the flash tank offgas shall be used as fuel in the reboiler (2E).
- b. The reboiler shall only be fired with vapors from the flash tank, and natural gas may be used as supplemental fuel.

7.1.5. Any source that determines it is not a major source but has actual emissions of 5 tons per year or more of a single HAP, or 12.5 tons per year or more of a combination of HAP (i.e., 50 percent of the major source thresholds), shall update its major source determination within 1 year of the prior determination or October 15, 2012, whichever is later, and each year thereafter, using gas composition data measured during the preceding 12 months.
[40CFR§63.760(c)]

- 7.1.6. The permittee is exempt from the requirements of 40CFR§63.760(b)(2) if the criteria below is met, except that the records of the determination of these criteria must be maintained as required in 40CFR§63.774(d)(1).
- a. The actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram per year (1 ton/yr), as determined by the procedures specified in §63.772(b)(2) of this subpart.
[40CFR§63.764(e)]

7.2. Monitoring Requirements

- 7.2.1. The permittee shall monitor the throughput of wet natural gas fed to the dehydration system on a monthly basis for the glycol dehydration unit (3E).
- 7.2.2. In order to demonstrate compliance with the area source status, claimed within sections 7.1.2 and 7.1.3, as well as the benzene exemption provided under section 7.1.6, the following parameters shall be measured at least once quarterly, with the exception of natural gas flowrate annual daily average, natural gas flowrate maximum design capacity, and wet gas composition, in order to define annual average values or, if monitoring is not practical, some parameters may be assigned default values as listed below.
- a. Natural Gas Flowrate
- Operating hours per quarter
 - Quarterly throughput (MMscf/quarter)
 - Annual daily average (MMscf/day), and
 - Maximum design capacity (MMscf/day)
- b. Absorber temperature and pressure
- c. Lean glycol circulation rate
- d. Glycol pump type and maximum design capacity (gpm)
- e. Flash tank temperature and pressure, if applicable
- f. Stripping Gas flow rate, if applicable
- g. Wet gas composition (upstream of the absorber – dehydration column) sampled in accordance with GPA method 2166 and analyzed consistent with GPA extended method 2286 as well as the procedures presented in the GRI-GLYCalc™ Technical Reference User Manual and Handbook V4
- h. Wet gas water content (lbs H₂O/MMscf)
- i. Dry gas water content (lbs H₂O/MMscf) at a point directly after exiting the dehydration column and before any additional separation points

The following operating parameter(s) may be assigned default values when using GRI-GLYCalc:

- Dry gas water content can be assumed to be equivalent to pipeline quality at 7 lb H₂O / MMscf
- Wet gas water content can be assumed to be saturated
- Lean glycol water content if not directly measured may use the default value of 1.5 % water as established by GRI
- Lean glycol circulation rate may be estimated using the TEG recirculation ratio of 3 gal TEG / lb H₂O removed.

Note: If you are measuring and using actual wet or dry gas water content, then you should also measure the glycol recirculation rate rather than using the default TEG recirculation ratio.
[45CSR§13-5.11, §63.772(b)(2)(i)]

7.3. Testing Requirements

- 7.3.1. The permittee shall determine the composition of the wet natural gas by sampling in accordance with GPA Method 2166 and analyzing according to extended GPA Method 2286 analysis as specified in the GRI-GLYCalc™ V4 Technical Reference User Manual and Handbook. As specified in the handbook, the permittee shall sample the wet gas stream at a location prior to the glycol dehydration contactor column, but after any type of separation device, in accordance with GPA method 2166. The permittee may utilize other equivalent methods provided they are approved in advance by DAQ as part of a testing protocol. If alternative methods are proposed, a test protocol shall be submitted for approval no later than 60 days before the scheduled test date. The initial compliance test must be conducted within 180 days of permit issuance or within 180 days of startup of the glycol dehydration unit, whichever is later.

Note: The DAQ defines a representative wet gas sample to be one that is characteristic of the average gas composition dehydrated throughout a calendar year. If an isolated sample is not indicative of the annual average composition, the permittee may opt to produce a weighted average based on throughput between multiple sampling events, which can be used to define a more representative average annual gas composition profile.

[45CSR§13-5.11]

- 7.3.2. The following testing and compliance provisions of Part 63 Subpart HH National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities are applicable to the facility:

§ 63.772 Test methods, compliance procedures, and compliance demonstrations.

- (b) Determination of glycol dehydration unit flowrate, benzene emissions, or BTEX emissions. The procedures of this paragraph shall be used by an owner or operator to determine glycol dehydration unit natural gas flowrate, benzene emissions, or BTEX emissions.
- (2) The determination of actual average benzene emissions or BTEX emissions from a glycol dehydration unit shall be made using the procedures of paragraph (b)(2)(i) of this requirement. Emissions shall be determined either uncontrolled, or with federally enforceable controls in place.
- (i) The owner or operator shall determine actual average benzene emissions using the model GRI-GLYCalc™, Version 3.0 or higher, and the procedures presented in the associated GRI-GLYCalc™ Technical Reference Manual. Inputs to the model shall be representative of actual operating conditions of the glycol dehydration unit and may be determined using the procedures documented in Gas Research Institute (GRI) report entitled "Atmospheric Rich/Lean Method for Determining Glycol Dehydrator Emissions" (GRI-95/0368.1).

[§63.772(b)(2)(i)]

7.4. Recordkeeping Requirements

- 7.4.1. The permittee shall maintain a record of the wet natural gas throughput through the glycol dehydration units/still column (3E) to demonstrate compliance with section 7.1.1 of this permit. Said records shall be maintained for a period of five (5) years on site or in a readily accessible off-site location maintained by the permittee. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.
- 7.4.2. For the purpose of documenting compliance with the emission limitations, HAP major source thresholds, as well as the benzene exemption, the permittee shall maintain records of all monitoring data, wet gas sampling, and annual GRI-GLYCalc™ emission estimates. Said records shall be maintained for a period of five (5) years on site or in a readily accessible off-site location maintained by the permittee. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.
- [45CSR§13-5.11]

8.0. Source-Specific Requirements (Truck Loading, 6E)

8.1. Limitations and Standards

- 8.1.1. The maximum quantity of produced water that shall be loaded (6E) shall not exceed 211,680 gallons per year.
- 8.1.2. The Produced Water Truck Loading (6E) shall be operated in accordance with the plans and specifications filed in Permit Application R13-3109.

8.2. Recordkeeping Requirements

- 8.2.1. For the purpose of demonstrating compliance with section 8.1.1, the permittee shall maintain records of the amount of produced water loaded into tank trucks (6E).
- 8.2.2. All records required under Section 8.2 shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

9.0. Source-Specific Requirements (Storage Tanks, 4E, 5E)

9.1. Limitations and Standards

- 9.1.1. The maximum throughput to the storage tanks (4E, 5E) shall not exceed 211,680 gallons per year for both tanks combined.

9.2. Recordkeeping Requirements

- 9.2.1. For the purpose of demonstrating compliance with section 9.1.1, the permittee shall maintain records of the maximum tank throughput of the storage tanks (4E, 5E).
- 9.2.2. All records required under Section 9.2 shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

10.0. Source-Specific Requirements (40CFR60 Subpart JJJJ Requirements, 1E)

Any changes to 40 CFR Part 60, Subpart JJJJ shall supersede the 40 CFR Part 60, Subpart JJJJ requirements contained in this permit.

10.1. Limitations and Standards

- 10.1.1. The provisions of this subpart are applicable to owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified below. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.
- a. Owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:
 1. *Reserved;*
 2. *Reserved;*
 3. on or after July 1, 2008, for engines with a maximum engine power less than 500 HP; or
 4. *Reserved.*
 - b. Owners and operators of stationary SI ICE that commence modification or reconstruction after June 12, 2006.
[40CFR§60.4230(a)]
- 10.1.2. The provisions of this subpart are not applicable to stationary SI ICE being tested at an engine test cell/stand. [40CFR§60.4230(b)]
- 10.1.3. If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable. [40CFR§60.4230(c)]
- 10.1.4. Stationary SI ICE may be eligible for exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C (or the exemptions described in 40 CFR parts 90 and 1048, for engines that would need to be certified to standards in those parts), except that owners and operators, as well as manufacturers, may be eligible to request an exemption for national security. [40CFR§60.4230(e)]
- 10.1.5. Owners and operators of facilities with internal combustion engines that are acting as temporary replacement units and that are located at a stationary source for less than 1 year and that have been properly certified as meeting the standards that would be applicable to such engine under the appropriate nonroad engine provisions, are not required to meet any other provisions under this subpart with regard to such engines. [40CFR§60.4230(f)]

10.2. Emission Standards for Owners and Operators

- 10.2.1. Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 to this subpart for their stationary SI ICE. For owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 100 HP (except gasoline and rich burn engines that use LPG) manufactured prior to January 1, 2011 that were certified to the certification emission standards in 40 CFR part 1048 applicable to engines that are not severe duty engines, if such stationary SI ICE was certified to a carbon monoxide (CO) standard above the standard in Table 1 to this subpart, then the owners and operators may meet the CO certification (not field testing) standard for which the engine was certified.

[40CFR§60.4233(e)]

- 10.2.2. Owners and operators of stationary SI ICE that are required to meet standards that reference 40 CFR 1048.101 must, if testing their engines in use, meet the standards in that section applicable to field testing, except as indicated in paragraph (e) of this section. [40CFR§60.4233(h)]
- 10.2.3. Owners and operators of stationary SI ICE must operate and maintain stationary SI ICE that achieve the emission standards as required in §60.4233 over the entire life of the engine. [40CFR§60.4234]

10.3. Other Requirements for Owners and Operators

- 10.3.1. After July 1, 2010, owners and operators may not install stationary SI ICE with a maximum engine power of less than 500 HP that do not meet the applicable requirements in §60.4233. [40CFR§60.4236(a)]
- 10.3.2. The requirements of this section do not apply to owners and operators of stationary SI ICE that have been modified or reconstructed, and they do not apply to engines that were removed from one existing location and reinstalled at a new location. [40CFR§60.4236(e)]

10.4. Compliance Requirements for Owners and Operators

- 10.4.1. If you are an owner or operator of a stationary SI internal combustion engine and must comply with the emission standards specified in §60.4233(d) or (e), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) and (2) of this section.
- a. Purchasing an engine certified according to procedures specified in this subpart, for the same model year and demonstrating compliance according to one of the methods specified in paragraph (a) of this section.
 - b. Purchasing a non-certified engine and demonstrating compliance with the emission standards specified in §60.4233(d) or (e) and according to the requirements specified in §60.4244, as applicable, and according to paragraphs (b)(2)(i) and (ii) of this section.
 1. If you are an owner or operator of a stationary SI internal combustion engine greater than 25 HP and less than or equal to 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance.
 2. If you are an owner or operator of a stationary SI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance. [40CFR§60.4243(b)]
- 10.4.2. Owners and operators of stationary SI natural gas fired engines may operate their engines using propane for a maximum of 100 hours per year as an alternative fuel solely during emergency operations, but must keep records of such use. If propane is used for more than 100 hours per year in an engine that is not certified to the emission standards when using propane, the owners and operators are required to conduct a performance test to demonstrate compliance with the emission standards of §60.4233. [40CFR§60.4243(e)]

- 10.4.3. If you are an owner or operator of a stationary SI internal combustion engine that is less than or equal to 500 HP and you purchase a non-certified engine or you do not operate and maintain your certified stationary SI internal combustion engine and control device according to the manufacturer's written emission-related instructions, you are required to perform initial performance testing as indicated in this section, but you are not required to conduct subsequent performance testing unless the stationary engine is rebuilt or undergoes major repair or maintenance. A rebuilt stationary SI ICE means an engine that has been rebuilt as that term is defined in 40 CFR 94.11(a). [40CFR§60.4243(f)]
- 10.4.4. It is expected that air-to-fuel ratio controllers will be used with the operation of three-way catalysts/non-selective catalytic reduction. The AFR controller must be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times. [40CFR§60.4243(g)]

10.5. Testing Requirements for Owners and Operators

- 10.5.1. Owners and operators of stationary SI ICE who conduct performance tests must follow the procedures in paragraphs (a) through (f) of this section.
- Each performance test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and according to the requirements in §60.8 and under the specific conditions that are specified by Table 2 to this subpart. [40CFR§60.4244(a)]
 - You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in §60.8(c). If your stationary SI internal combustion engine is non-operational, you do not need to startup the engine solely to conduct a performance test; however, you must conduct the performance test immediately upon startup of the engine. [40CFR§60.4244(b)]
 - You must conduct three separate test runs for each performance test required in this section, as specified in §60.8(f). Each test run must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and last at least 1 hour. [40CFR§60.4244(c)]
 - To determine compliance with the NO_x mass per unit output emission limitation, convert the concentration of NO_x in the engine exhaust using Equation 1 of this section:

$$ER = \frac{C_a \times 1.912 \times 10^{-3} \times Q \times T}{HP-hr} \quad (Eq. 1)$$

Where:

ER = Emission rate of NO_x in g/HP-hr.

C_a = Measured NO_x concentration in parts per million by volume (ppmv).

1.912×10⁻³ = Conversion constant for ppm NO_x to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, horsepower-hour (HP-hr).

[40CFR§60.4244(d)]

- e. To determine compliance with the CO mass per unit output emission limitation, convert the concentration of CO in the engine exhaust using Equation 2 of this section:

$$ER = \frac{C_a \times 1.164 \times 10^{-3} \times Q \times T}{HP-hr} \quad (\text{Eq. 2})$$

Where:

ER = Emission rate of CO in g/HP-hr.

C_a = Measured CO concentration in ppmv.

1.164×10^{-3} = Conversion constant for ppm CO to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

[40CFR§60.4244(e)]

- f. For purposes of this subpart, when calculating emissions of VOC, emissions of formaldehyde should not be included. To determine compliance with the VOC mass per unit output emission limitation, convert the concentration of VOC in the engine exhaust using Equation 3 of this section:

$$ER = \frac{C_a \times 1.833 \times 10^{-3} \times Q \times T}{HP-hr} \quad (\text{Eq. 3})$$

Where:

ER = Emission rate of VOC in g/HP-hr.

C_a = VOC concentration measured as propane in ppmv.

1.833×10^{-3} = Conversion constant for ppm VOC measured as propane, to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

[40CFR§60.4244(f)]

- g. If the owner/operator chooses to measure VOC emissions using either Method 18 of 40 CFR part 60, appendix A, or Method 320 of 40 CFR part 63, appendix A, then it has the option of correcting the measured VOC emissions to account for the potential differences in measured values between these methods and Method 25A. The results from Method 18 and Method 320 can be corrected for response factor differences using Equations 4 and 5 of this section. The corrected VOC concentration can then be placed on a propane basis using Equation 6 of this section.

$$RF_i = \frac{C_{M_i}}{C_{A_i}} \quad (\text{Eq. 4})$$

Where:

RF_i = Response factor of compound i when measured with EPA Method 25A.

C_{M_i} = Measured concentration of compound i in ppmv as carbon.

C_{A_i} = True concentration of compound i in ppmv as carbon.

$$C_{\text{corr}} = RF \times C_{\text{meas}} \quad (\text{Eq. 5})$$

Where:

C_{corr} = Concentration of compound i corrected to the value that would have been measured by EPA Method 25A, ppmv as carbon.

C_{meas} = Concentration of compound i measured by EPA Method 320, ppmv as carbon.

$$C_{\text{req}} = 0.6098 \times C_{\text{corr}} \quad (\text{Eq. 6})$$

Where:

C_{req} = Concentration of compound i in mg of propane equivalent per DSCM.

[40CFR§60.4244(g)]

10.6. Notification, Reports, and Records for Owners and Operators

10.6.1. Owners or operators of stationary SI ICE must meet the following notification, reporting and recordkeeping requirements.

- a. Owners and operators of all stationary SI ICE must keep records of the information in paragraphs (a)(1) through (4) of this section.
 1. All notifications submitted to comply with this subpart and all documentation supporting any notification.
 2. Maintenance conducted on the engine.
 3. If the stationary SI internal combustion engine is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR parts 90 and 1048.
 4. If the stationary SI internal combustion engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to §60.4243(a)(2), documentation that the engine meets the emission standards.

[40CFR§60.4245(a)]

b. *Reserved;*

c. *Reserved;*

- d. Owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test as conducted in §60.4244 within 60 days after the test has been completed. [40CFR§60.4245]

11.0. Source-Specific Requirements (40CFR63 Subpart ZZZZ Requirements, 1E)

Any changes to 40 CFR Part 63, Subpart ZZZZ shall supersede the 40 CFR Part 63, Subpart ZZZZ requirements contained in this permit.

11.1. Limitations and Standards

11.1.1. The permittee must comply with the applicable operating limitations in this section no later than October 19, 2013.
[40 C.F.R. § 63.6595(a)]

11.1.2. *Stationary RICE subject to Regulations under 40 CFR Part 60.* An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

The permittee meets the criteria of paragraph (c)(1), which is for a new or reconstructed stationary RICE located at an area source. The permittee must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart JJJJ.

12.0. Source-Specific Requirements (40CFR60 Subpart OOOO Requirements, Reciprocating Compressor Associated With, Engine 1E)

12.1. Limitations and Standards

12.1.1. You must comply with the standards in paragraphs (a) through (d) of this section for each reciprocating compressor affected facility.

a. You must replace the reciprocating compressor rod packing according to either paragraph (a)(1) or (2) of this section.

1. Before the compressor has operated for 26,000 hours. The number of hours of operation must be continuously monitored beginning upon initial startup of your reciprocating compressor affected facility, or October 15, 2012, or the date of the most recent reciprocating compressor rod packing replacement, whichever is later.

2. Prior to 36 months from the date of the most recent rod packing replacement, or 36 months from the date of startup for a new reciprocating compressor for which the rod packing has not yet been replaced.

b. You must demonstrate initial compliance with standards that apply to reciprocating compressor affected facilities as required by § 60.5410.

c. You must demonstrate continuous compliance with standards that apply to reciprocating compressor affected facilities as required by § 60.5415.

d. You must perform the required notification, recordkeeping, and reporting as required by § 60.5420. [40CFR§60.5385, Reciprocating Compressor Engines]

12.2. Initial Compliance Demonstration

12.2.1. You must determine initial compliance with the standards for each affected facility using the requirements in paragraph (c) of this section. The initial compliance period begins on October 15, 2012 or upon initial startup, whichever is later, and ends no later than one year after the initial startup date for your affected facility or no later than one year after October 15, 2012. The initial compliance period may be less than one full year.

c. To achieve initial compliance with the standards for each reciprocating compressor affected facility you must comply with paragraphs (c)(1) through (4) of this section.

1. During the initial compliance period, you must continuously monitor the number of hours of operation or track the number of months since the last rod packing replacement.

2. You must submit the notifications required in 60.7(a)(1), (3), and (4).

3. You must submit the initial annual report for your reciprocating compressor as required in § 60.5420(b).

4. You must maintain the records as specified in § 60.5420(c)(3) for each reciprocating compressor affected facility.

[40CFR§60.5410]

12.3. Continuous Compliance Demonstration

12.3.1. For each reciprocating compressor affected facility, you must demonstrate continuous compliance according to paragraphs (1) through (3) of this section.

1. You must continuously monitor the number of hours of operation for each reciprocating compressor affected facility or track the number of months since initial startup, or October 15, 2012, or the date of the most recent reciprocating compressor rod packing replacement, whichever is later.
2. You must submit the annual report as required in § 60.5420(b) and maintain records as required in § 60.5420(c)(3).
3. You must replace the reciprocating compressor rod packing before the total number of hours of operation reaches 26,000 hours or the number of months since the most recent rod packing replacement reaches 36 months.

12.3.2. Affirmative defense for violations of emission standards during malfunction. In response to an action to enforce the standards set forth in §§ 60.5375, you may assert an affirmative defense to a claim for civil penalties for violations of such standards that are caused by malfunction, as defined at § 60.2. Appropriate penalties may be assessed, however, if you fail to meet your burden of proving all of the requirements in the affirmative defense. The affirmative defense shall not be available for claims for injunctive relief.

(1) To establish the affirmative defense in any action to enforce such a standard, you must timely meet the reporting requirements in § 60.5420(a), and must prove by a preponderance of evidence that:

(i) The violation:

(A) Was caused by a sudden, infrequent, and unavoidable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner; and

(B) Could not have been prevented through careful planning, proper design or better operation and maintenance practices; and

(C) Did not stem from any activity or event that could have been foreseen and avoided, or planned for; and

(D) Was not part of a recurring pattern indicative of inadequate design, operation, or maintenance; and

(ii) Repairs were made as expeditiously as possible when a violation occurred. Off-shift and overtime labor were used, to the extent practicable to make these repairs; and

(iii) The frequency, amount and duration of the violation (including any bypass) were minimized to the maximum extent practicable; and

(iv) If the violation resulted from a bypass of control equipment or a process, then the bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and

(v) All possible steps were taken to minimize the impact of the violation on ambient air quality, the environment and human health; and

(vi) All emissions monitoring and control systems were kept in operation if at all possible, consistent with safety and good air pollution control practices; and

(vii) All of the actions in response to the violation were documented by properly signed, contemporaneous operating logs; and

(viii) At all times, the affected source was operated in a manner consistent with good practices for minimizing emissions; and

(ix) A written root cause analysis has been prepared, the purpose of which is to determine, correct, and eliminate the primary causes of the malfunction and the violation resulting from the malfunction event at issue. The analysis shall also specify, using best monitoring methods and engineering judgment, the amount of any emissions that were the result of the malfunction.

(2) Report. The owner or operator seeking to assert an affirmative defense shall submit a written report to the Administrator with all necessary supporting documentation, that it has met the requirements set forth in paragraph (h)(1) of this section. This affirmative defense report shall be included in the first periodic compliance, deviation report or excess emission report otherwise required after the initial occurrence of the violation of the relevant standard (which may be the end of any applicable averaging period). If such compliance, deviation report or excess emission report is due less than 45 days after the initial occurrence of the violation, the affirmative defense report may be included in the second compliance, deviation report or excess emission report due after the initial occurrence of the violation of the relevant standard.

[40CFR§60.5415]

12.4. Notification, Recordkeeping and Reporting Requirements

12.4.1. You must submit the notifications required in § 60.7(a)(1) and (4), and according to paragraphs (a)(1) and (2) of this section, if you own or operate one or more of the affected facilities specified in § 60.5365 that was constructed, modified, or reconstructed during the reporting period.

12.4.2. Reporting requirements. You must submit annual reports containing the information specified in paragraphs (b)(4) of this section to the Administrator and performance test reports as specified in paragraph (b)(7) of this section. The initial annual report is due 30 days after the end of the initial compliance period as determined according to § 60.5410. Subsequent annual reports are due on the same date each year as the initial annual report. If you own or operate more than one affected facility, you may submit one report for multiple affected facilities provided the report contains all of the information required as specified in paragraphs (b)(1) through (6) of this section. Annual reports may coincide with title V reports as long as all the required elements of the annual report are included. You may arrange with the Administrator a common schedule on which reports required by this part may be submitted as long as the schedule does not extend the reporting period.

(1) The general information specified in paragraphs (b)(1)(i) through (iv) of this section.

(i) The company name and address of the affected facility.

(ii) An identification of each affected facility being included in the annual report.

(iii) Beginning and ending dates of the reporting period.

(iv) A certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

(4) For each reciprocating compressor affected facility, the information specified in paragraphs (b)(4)(i) through (ii) of this section.

(i) The cumulative number of hours of operation or the number of months since initial startup, October 15, 2012, or since the previous reciprocating compressor rod packing replacement, whichever is later.

(ii) Records of deviations specified in paragraph (c)(3)(iii) of this section that occurred during the reporting period.

(7)(i) Within 60 days after the date of completing each performance test (see § 60.8 of this part) as required by this subpart you must submit the results of the performance tests required by this subpart to EPA's WebFIRE database by using the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (www.epa.gov/cdx). Performance test data must be submitted in the file format generated through use of EPA's Electronic Reporting Tool (ERT) (see <http://www.epa.gov/ttn/chieffert/index.html>). Only data collected using test methods on the ERT Web site are subject to this requirement for submitting reports electronically to WebFIRE. Owners or operators who claim that some of the information being submitted for performance tests is confidential business information (CBI) must submit a complete ERT file including information claimed to be CBI on a compact disk or other commonly used electronic storage media (including, but not limited to, flash drives) to EPA. The electronic media must be clearly marked as CBI and mailed to U.S. EPA/OAPQS/CORE CBI Office, Attention: WebFIRE Administrator, MD C404-02, 4930 Old Page Rd., Durham, NC 27703. The same ERT file with the CBI omitted must be submitted to EPA via CDX as described earlier in this paragraph. At the discretion of the delegated authority, you must also submit these reports, including the confidential business information, to the delegated authority in the format specified by the delegated authority.

(ii) All reports required by this subpart not subject to the requirements in paragraph (a)(2)(i) of this section must be sent to the Administrator at the appropriate address listed in § 63.13 of this part. The Administrator or the delegated authority may request a report in any form suitable for the specific case (e.g., by commonly used electronic media such as Excel spreadsheet, on CD or hard copy). The Administrator retains the right to require submittal of reports subject to paragraph (a)(2)(i) and (ii) of this section in paper format.

[40CFR§60.5420]

12.4.3. Recordkeeping requirements. You must maintain the records identified as specified in § 60.7(f) and in paragraph (c)(1) of this section. All records must be maintained for at least 5 years.

- (3) For each reciprocating compressors affected facility, you must maintain the records in paragraphs (c)(3)(i) through (iii) of this section.
- (i) Records of the cumulative number of hours of operation or number of months since initial startup or October 15, 2012, or the previous replacement of the reciprocating compressor rod packing, whichever is later.
 - (ii) Records of the date and time of each reciprocating compressor rod packing replacement.
 - (iii) Records of deviations in cases where the reciprocating compressor was not operated in compliance with the requirements specified in § 60.5385.
- [40CFR§60.5420]

CERTIFICATION OF DATA ACCURACY

I, the undersigned, hereby certify that, based on information and belief formed after reasonable inquiry, all information contained in the attached _____, representing the period beginning _____ and ending _____, and any supporting documents appended hereto, is true, accurate, and complete.

Signature¹

(please use blue ink)

Responsible Official or Authorized Representative

Date

Name & Title

(please print or type)

Name

Title

Telephone No. _____

Fax No. _____

¹ This form shall be signed by a "Responsible Official." "Responsible Official" means one of the following:

- a. For a corporation: The president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit and either:
 - (i) the facilities employ more than 250 persons or have a gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), or
 - (ii) the delegation of authority to such representative is approved in advance by the Director;
- b. For a partnership or sole proprietorship: a general partner or the proprietor, respectively;
- c. For a municipality, State, Federal, or other public entity: either a principal executive officer or ranking elected official. For the purposes of this part, a principal executive officer of a Federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., a Regional Administrator of U.S. EPA); or
- d. The designated representative delegated with such authority and approved in advance by the Director.



west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone: (304) 926-0475 • FAX: (304) 926-0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

March 10, 2014

CERTIFIED MAIL
91 7199 9991 7032 6258 6281

Jack Hamel
Park Place Corporate Center 2
2000 Commerce Drive
Pittsburgh, PA 15275

Re: Williams Ohio Valley Midstream LLC
Taylor Station
Permit No. R13-3109A
Plant ID No. 051-00156

Dear Mr. Hamel:

Your application for a permit as required by Section 5 of 45CSR13 - "Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permit, General Permit, and Procedures for Evaluation" has been approved. The enclosed permit R13-3109A is hereby issued pursuant to Subsection 5.7 of 45CSR13. Please be aware of the notification requirements in the permit which pertain to commencement of construction, modification, or relocation activities; startup of operations; and suspension of operations.

The source is not subject to 45CSR30.

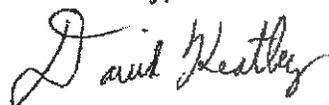
In accordance with 45CSR22 - Air Quality Management Fee Program, the permittee shall not operate nor cause to operate the permitted facility or other associated facilities on the same or contiguous sites comprising the plant without first obtaining and having in current effect a Certificate to Operate (CTO). Such Certificate to Operate (CTO) shall be renewed annually, shall be maintained on the premises for which the Certificate has been issued, and shall be made immediately available for inspection by the Secretary or his/her duly authorized representative.

Any person whose interest may be affected, including, but not necessarily limited to, the applicant and any person who participated in the public comment process, by a permit issued, modified or denied by the Secretary may appeal such action of the Secretary to the Air Quality Board pursuant to article one [§§22B-1-1 et seq.], Chapter 22B of the Code of West Virginia. West Virginia Code §§22-5-14.

Promoting a healthy environment.

Should you have any questions or comments, please contact me at (304) 926-0499, extension 1224.

Sincerely,

A handwritten signature in cursive script that reads "David Keatley".

David Keatley
Permit Writer - NSR Permitting

Enclosures

APPLICATION FEE

Include a check payable to WVDEP – Division of Air Quality.

- As per WV Rule 22 (45CSR22) filed on May 6, 1991, a **minimum fee of \$1,000** must be submitted for each 45CSR13 permit application filed with the WVDEP-DAQ.
 - **Additional charges** may apply, depending on the nature of the application as outlined in Section 3.4.b. of Regulation 22, and shown below:
 - NSPS Requirements: \$1,500 Not Applicable
 - NESHAP Requirements: \$2,500 Not Applicable
 - Total application fee is **\$1,000** [= \$1,000 minimum fee + \$0 additional charges]
-

****** End of Application for 45CSR13 NSR Permit ******

Williams Ohio Valley Midstream LLC
TAYLOR COMPRESSOR STATION
Application for 45CSR13 NSR Modification Permit